Normanton Local Community Energy Assessment

Nottingham Energy Partnership

On behalf of

Normanton Neighbourhood Board

March 2012

This report has been produced by:

Jerome Baddley, AIEMA, PGCE, BSc Hons,
NEP Energy Services Ltd

NEP Energy Services Ltd
Part of the Nottingham Energy Partnership (NEP), established in 1997.

Address:
10th Floor
Castle Heights Building
72 Maid Marian Way
Nottingham
NG1 6BJ

Telephone: 0115 985 9057
Email: Jerome.b@nottenergy.com
Website: www.nottenergy.com

Company number: 4257637
Charity number: 1091513

Contents

Acknowledgments

Thanks for their contribution to this report:

Normanton Neighborhood Board

Derby City Council

Derby City Homes

HI4EM

Executive summary

The Local Energy Assessment Fund aims to support communities across England and Wales to play an active role in the development of a low carbon society where energy supply is both secure and affordable. The fund has resourced work by community groups to understand their potential for improvements in energy efficiency and local deployment of renewable energy, alongside demonstrations of solid wall insulation.

NEP were commissioned to survey a sample of Normanton properties to help determine the opportunity in Normanton and suggest projects and programmes to fit the opportunity and local community make up.

220 homes and a large amount of supporting information were assessed to develop this report.

It is likely that cultural and financial barriers will prevent many in Normanton from accessing the Green Deal home loan programme. Many people in less affluent communities simply do not want to borrow money or be in debt, even if the debt is with the house rather than the person.

Given the large Muslim population in Normanton (22% from 2001 census figures) it would be prudent to ascertain whether the Green Deal meets the requirements of Sharia Law before promoting this scheme heavily to the local community. This could help ensure that programmes do not inadvertently discriminate against sections of the local community

This issue is dealt with briefly in the Green deal impact assessment [1]with the conclusion that ,these products may be more expensive and that if there is a market for such products than providers will provide them. If the market is busy enough providing non Sharia products however here may be no incentive to provide a more niche product for some time, disadvantaging muslim households

The programmes supported through the social ECO fund should not present the same problems as it will be broadly similar to the current grant aided programmes.

If levels of funding develop as they appear to be doing currently the Social ECO may even present an opportunity to provide solid wall insulation at no cost to the most vulnerable fuel poor households, called in the Super Priority Group. This group typically includes low income households, elderly or disabled, claiming one or more qualifying benefits.

Delivery of street by street programmes is recommended. For this a detailed tenure map of Normanton will be required and close engagement with the large number of local private landlords.

[1] http://www.decc.gov.uk/assets/decc/11/consultation/green-deal/3603-green-deal-eco-ia.pdf

2012 Information from CACI ltd suggests 81.4% home ownership, 18.1% LA rental and 0.5% private rented. This information is not bourn out by our sample, which has been cross referenced against known social housing. Information provided by Derby homes.
Our data shows that DCH manage 817 properties in Normanton, 12.8% of the homes in the area, there may of course be more operated by other social landlords such as Spirita.

Private rental made a far higher proportion of our sample, 32% of homes visited. Owner Occupiers however made up 53% of the households. This could suggest a very large number of unregistered small landlords. This has important implications for the role out of an area energy efficiency programme.

For landlords Green Deal type property investment will cost them nothing, however they will also not directly benefit, as both savings and repayments will be made by tenants through energy bills. There can be no guarantee that this type of work will increase the value of the home in terms of rental or resale value. Reassurance will be required that rents will not be affected, works will be made good with paint and finish and that provision will be made for tenants to be accommodated as work is being carried out.

Other similar programmes have used a decant house as a temporary accommodation for a day or 2 while residents homes are improved.

The main opportunity in Normanton is clearly from solid wall insulation

Based on energy surveys, the average income required to avoid fuel poverty in Normanton is £18,800 if homes are adequately heated. Householders in some property types, particularly semi detached solid wall properties, will need to have incomes in excess of £20k to avoid fuel poverty. It is suggested solid wall solutions for these more energy cost and carbon intensive properties are developed first

As terraced houses with passage are the most significant proportion of the terraced properties, it is worth looking at other areas where this type of property has already been retrofitted for solid wall insulation. A refurbishment project in Sheffield worked with just this type of property. The case study is published by the Energy Savings "Sheffield Eco terrace; A refurbishment case study"

Houses in the Normanton area are generally smaller than average, alongside the prevalence of semi-detached and terraced properties. This however along with the prevalence of solid walled properties suggests that energy use will be higher than average. Smaller numbers of rooms and a larger non working population who are likely to be home during the day, would suggest again that energy use through space heating may well be higher than average.

With the likelihood of longer occupied hours, thermal insulation may show better savings in Normanton than in other areas

A small but significant number of homes (13%) still have less than 75mm of loft insulation. There is still some opportunity for saving carbon emissions and reducing energy use here.

The local reasons for residual uninsulated lofts should be explored. Often roof spaces are used for storage and the inconvenience of emptying lofts for insulation, or the additional costs and loss of space from raising joists can be impediments to taking up the opportunity to install loft insulation.

Solutions could be include:

- **Incorporating work with local builders on raising joists into local energy efficiency schemes.**
- **Checking whether incorporating this work into insulation works would show a good return on investment if included in the costs finance packages to encourage increased take up.**
- **Establishing local community volunteer loft clearance schemes**
- **Working with trusted local agencies such as age concern, mosques. temples or community groups to offer loft clearance**

The intrusive nature of dry lining and the need to redecorate may be an impediment to undertaking this work. Again external insulation may be preferred initially. It would be valuable to identify a small number of pioneering early adopters, across the 3 identified main archetype housing types, who would be happy to undertake this work and act as case studies and advocates to convince others that the cost social and health and wellbeing benefits of such home improvement work outweigh the costs and disruption.

- **Data on energy bill and carbon savings vs costs from real life local examples should be sought.**
- **NEP have been delivering this type of work in Aspley and in the Radford and Hyson Green areas of Nottingham, with significant impacts for householders. Here the development of a show home and local community case studies has been invaluable.**

Energy use density in Normanton is around 18GWh/km2 per year, which is fairly high, suggesting that district heating could be viable.

Several large non domestic energy users are also positioned around the community, such as Rolls Royce to the South East, London Road Community Hospital to the North East and the Derby City General Hospital to the North West. Futher North West is the old Kingsway Hospital site, which is earmarked for residential development. The site hosts a signfifcant, but now decomissioned, coal fired heat plant, that could be converted for biomass.

Consideration could be given to encouraging any development on this site to include investment in low carbon district heating, either onsite or in neighbouing Normanton. Investment could be encouraged through local planning polic requirments, or thorugh the use of the expected Building Regulations driven ‘Allowable Solutions’ fund.

To ensure that revenues from any Allowable Solutions tariff stay in the local community, rather than be absorbed into a central government fund, will require communities and local authorities to have identified, mature investment ready opportunities. These investments will need to show clearly how they reduce carbon emissions to the level required to offset the new developmet.

Capturing funds from a development at the Kingsway site to support energy and carbon reduction in Normanton would have social, ecomonic and enviroenmental benefits.

26% of properties in Normanton have older boilers this represents a key opportunity for householders to save money and carbon, and should form a central part of any promotion of energy saving investment opportunities locally.

More efficient boilers offer one of the most significant opportunities for car bon and cost savings. There is significant opportunity here to promote boiler upgrades to Normanton households through promotion of the cost benefits of investment in modern heating systems.

Solid wall properties with 2-3 bedrooms, the prevalent housing type, are likely to have energy use requirements that are weighted towards space heating than water heating, making combination boilers the better option.

Measure	% of sample	Extrapolated opportunity in Normanton
Boiler upgrade, pre 2004	28%	1789
Boiler upgrade, pre 1999	13%	830
Cavity wall insulation	3%	192
Solid wall insulation	94%	6005
Loft top up(less than 200mm)	24%	1533
Virgin lofts(less than 50mm)	11%	703
Double glazing	3%	192

Archetypes

Three prevalent archetypes, were identified each representing more than 5% of the building stock. These three archetypes between them account for 77% of the housing stock.

In targeting programmes, maximum impact could be achieved by designing programmes around these three archetypes. Case study material targeted at these homes could have most resonance with the residents of Normanton.

Archetype 1-Mid terraced, no passage

5% of our sample, however cross referencing with other independent data sources suggests that that may be an underestimate of the total proportion across the area.

Characteristics

Habitable Rooms	4
Age	1930-49
Wall type	Solid
Build form	Mid terraced, no passage
Typical exemplar	Caxton Street
Occupancy	Many single, significant number of 6 or 7 occupancy
Tenure	Majority LA owned or private rented
Boiler	Typically non condensing combi
Loft insulation	Generally over 200mm
Average SAP rating	69
Average annual energy bill	£1,250
Household Income to avoid fuel poverty	£12,500
Hot water heating	Average 22% of energy bill, up to 33% with high occupancy, 11% for single occupancy
Electricity costs	Average 54% of total energy bill

Despite common preconceptions, internal insulation, if applied to front and back only, is unlikely to result insignificant lost floor area and internal space. Persuading residents of this will require the establishment of exemplar properties in the community.

Establishing whole street programmes where possible would benefit social tenants and private tenants. Collaboration with local landlords to develop programmes that cover all homes in a street, with Green Deal or ECO funded installations,, would be a good approach.

Recent statements from DECC imply that ECO funding will also be available for social housing[2]. This would open he way for these types of bulk, cross tenure programmes in Normanton. This would be especially applicable to this archetype where there is a high level of social ownership.

While most homes have combi boilers, the homes with large numbers of residents and high hot water use could potentially benefit from having tanked systems, however space availability may undermine this. Working with single or low occupancy homes to support energy saving through better energy management, could further reduce energy bills and carbon emissions

Archetype 2-Mid terraced with passage

[2] http://www.decc.gov.uk/en/content/cms/news/dpm_eco/dpm_eco.aspx

This group represents 26% of our sample, though cross referencing other independent data sources suggests that this is the most prevalent archetype in Normanton.

Characteristics

Habitable Rooms	4-5
Age	Pre 1900, 1900-29
Wall type	Solid
Build form	Mid terraced with passage
Typical exemplar	Crewe street (pre 1900), Balfour road (1900-29)
Occupancy	Average 3.3, 34% with 1-2 occupants
Tenure	50% owner occupied, 50% private rented
Boiler	Roughly 1/3 combi, 1/3 condensing combi, 1/3 system
Loft insulation	Most over 200mm 23% less than 50mm
Lighting	32% no low energy lighting, 50% in 4 room properties
Average SAP rating	58
Average annual energy bill	£1,800
Household Income to avoid fuel poverty	£18,200
Hot water heating as proportion of energy bills	15% average
Electricity costs	40% average, 60% under high occupancy

The homes with the largest hot water heating bills are those with standard boilers in these homes, hot water costs make up around 21% of the overall energy bill as compared to 12% of the energy bill in homes with combi boilers. System boilers add about £325 to the annual household energy bill. Homes with Combi boilers would need to earn £17,300 to avoid fuel poverty as opposed to £20,500 in those with system boilers. Homes with condensing combi boilers would need to earn on average £16,900 to avoid fuel poverty.

With this archetype the prevalence of private rented and owner occupied properties mean that convincing landlords and home owners of the suitability of solid wall insulation may be a critical path.

Insulating mid terraced properties with passages will present a number of specific challenges. Ensuring that external insulation of passage ways does not restrict access for the movement of bins for example. Insulating over passages will also be necessary.

The lower than typical levels of low energy lighting and prevalence of lower levels of occupancy should be considered in any programmes for this archetype. This would suggest that education and behaviour change programmes should be included alongside any offers of building fabric upgrades. Landlords should be encouraged to switch bulbs for low energy bulbs at time of letting

The fairly high number of homes still with insufficient loft insulation should be addressed quickly, before the end of the current CERT programme. Engagement with landlords and local community

representatives such as neighbourhood watch and local faith centres should be a priority, with the message that after the end of this year home owners may have to pay for work themselves.

Archetype 3-Semi detached

This group represents 45% of our sample though cross referencing with other independent data suggests that this is an overestimate of the proportion of semi detached housing in Normanton; the actual proportion being closer to 28%.

Habitable Rooms	4-5
Age	1930-49
Wall type	Solid
Build form	Semi detached
Typical exemplar	Bethulie Road, Portland Street, Pear Tree Crescent
Occupancy	Average 3.4 40% with 1-2 occupants
Tenure	32% owner occupied, 60% private rented
Boiler	44% combi, 28% condensing combi, 21% non con. system
Loft insulation	Most over 200mm 10% less than 75mm
Lighting	20% reported less than 50% low energy bulbs
Average SAP rating	49
Average annual energy bill	£2,085
Household Income to avoid fuel poverty	£20, 850
Hot water heating as proportion of energy bills	13% average
Electricity costs	36% average

The homes with the largest hot water heating bills are those with standard boilers. In these homes system boilers add about £230 to the annual household energy bill.

With this archetype, the prevalence of private rented and owner occupied properties mean that convincing landlords and home owners of the suitability of solid wall insulation may be a critical path.

Finding local exemplars of installed solid wall insulation in Pear Tree and monitoring energy use, may be a useful route to providing evidence and case studies for local residents of the financial benefits and implications for internal space with solid wall insulation

The very high potential for fuel poverty in this housing archetype should support the application of programmes that use Social ECO funding to provide potentially free solid wall insulation. This could go some way towards convincing private landlords and home owners that upgrades are desirable.

Lower levels of occupancy should be considered in any programmes. This would suggest that education and behaviour change programmes that support households in reducing unnecessary heating of unoccupied rooms, should be included alongside any offers of building fabric upgrades

If it is not already in place it is essential that work is done to engage small private land lords in the area. An offer of support in accessing ECO grants to upgrade properties, potentially at no cost, could encourage landlords to come forwards and register an interest.

Background

The Local Energy Assessment Fund aims to support communities across England and Wales to play an active role in the development of a low carbon society where energy supply is both secure and affordable. The fund has resourced work by community groups to understand their potential for improvements in energy efficiency and local deployment of renewable energy, alongside demonstrations of solid wall insulation.

The grant fund provided by the programme was intended to help communities to prepare for new opportunities in sustainable energy and climate change arising from the Green Deal, Renewable Heat Incentive and Feed in Tariffs. The grants could be used to fund projects that follow the Energy Hierarchy (reduce energy use, use energy efficiently, generate renewable energy); specifically the following types of activity:

Energy efficiency

- Understanding what the potential for energy saving is in homes within your community, how that could be delivered cost effectively under the Green Deal in a way that allows the community to realise some of the benefit.
- Demonstrating energy saving technologies such as solid wall insulation in local homes and using community buildings as exemplars of energy saving technologies and measures.
- Helping local people to understand the potential of energy saving measures and behaviours.

Renewable energy

- Area-wide studies to highlight which renewable energy technologies would be most appropriate and beneficial for the area.
- Outline feasibility studies into specific renewable energy projects that could be financed through Feed in Tariffs, Renewable Heat Incentive or the new renewable energy revolving fund.

This fund is a response by Department of Energy and Climate Change to the efforts of community groups across the UK in raising awareness of climate change and energy issues. It aims to help empower communities to play an active role in the development of the low carbon economy within England and Wales.

National policy

There has been a step change in policies relating to carbon reduction and energy security over the last 5 years. This has been underpinned by the interdependent issues of climate change, power supply security and peak oil. There is now a small window of opportunity to meet the parallel global challenges of avoiding dangerous climate change, preparing for peak oil and, against the national picture of potential power supply insecurity towards 2017, ensuring continuity of affordable energy supply in Normanton

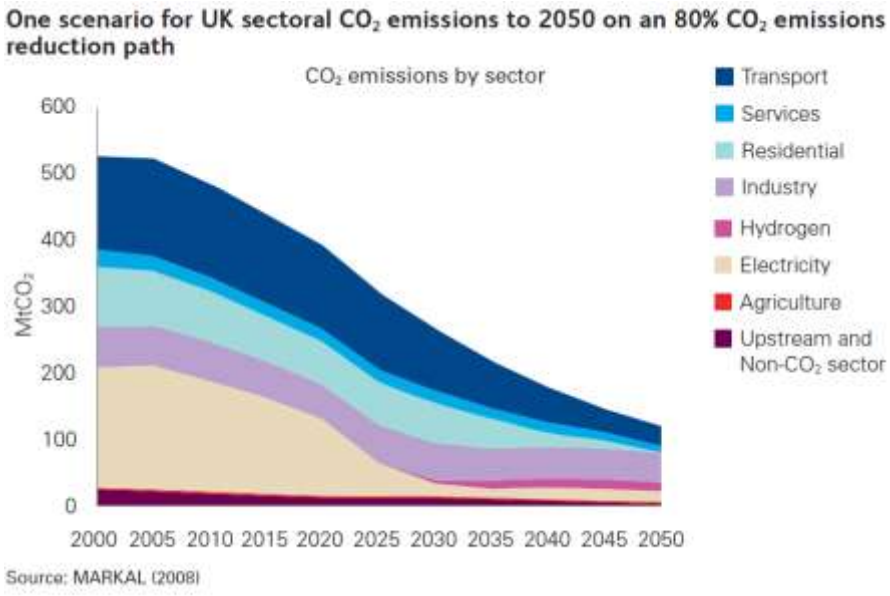
The UK's energy policy aims to meet the challenge of reducing carbon emissions as well as providing a secure and safe supply of affordable energy. Renewable energy and energy efficiency are seen as key

elements of the national strategy. In particular the national strategy will work towards decarbonising the energy supply, which will help to meet long term climate change targets. As part of the EU Climate and Energy package, the UK has committed to sourcing 15% of its energy (both heat and power) from renewable sources by 2020[3].

The target of sourcing 15% of energy from renewable sources nationally needs to take into account the changes to demand for energy. It is expected that even while the population grows, national energy consumption will decrease from 1695 TWh in 2008 to 1590 TWh by 2020, a total fall of 6.2% or a per capita fall of 13.7%[4]. Energy efficiency is therefore also an important part of national energy policies.

Nationally the renewable energy targets could be achieved from different sectors. The Government has decided to take the following[5] as the lead scenario:

- 30% of electricity demand met by renewables (2% from small-scale sources such as domestic solar power and 28% from large scale renewables);
- 12% of heat demand from renewables;
- 10% of transport demand from renewables.



The Government has set a series of interim targets and carbon budgets from 2011 to 2018 to ensure the UK is on track to meet the overall 2020 target[6] (set by the Committee on Climate Change, CCC[7], in respect of the

[3] The UK Renewable Energy Strategy (2009). Page 10. Available at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

[4] Population projections by the Office for National Statistics (ONS): http://www.statistics.gov.uk

[5] The UK Renewable Energy Strategy (2009). Page 8. Available at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

[6] The UK's Climate Change Act (CCA, 2008) creates a new approach to managing and responding to climate change in the UK. At the heart of the Act is a legally binding target to reduce the UK's greenhouse gas emissions to at least 80 % below 1990 levels by 2050, to be achieved through action at home and abroad. To drive progress towards this target, the Act introduces five year "carbon budgets", which define the emissions pathway to the 2050 target by limiting the total greenhouse gas emissions allowed in each five year period, beginning in 2008. Alongside Budget 2009, the Government announced that it agreed with the Committee on Climate Change (CCC)'s approach on carbon budgets and intended to set the levels of the budgets now for the period 2008-2022. These 'interim' budgets require a reduction in greenhouse gas emissions by at least 34% by 2020, relative to 1990 levels. The first three carbon budgets were designated as 2008-12, 2013-17, and 2018-22. Further details available at: http://www.hm-treasury.gov.uk/bud_bud09_carbon.htm

[7] The Committee on Climate Change (CCC) is an independent body established under the Climate Change Act (CCA, 2008) to advise the UK Government on setting carbon budgets, and to report to Parliament on the progress made in reducing greenhouse gas emissions. Further information at: http://www.theccc.org.uk/

national 80% CO_2 reduction target and ratified in the 2009 budget to 2020).

Peak oil and energy security

"Energy reserves are concentrated in some of the most unstable parts of the world. That's an issue of national security. There is no crisis but we can never be complacent. As we move out of recession, the global grab for energy will resume in earnest, consumption is predicted to rise, and with it, prices"[8].

"Complete energy independence is an unrealistic goal but there is much we can do to insulate ourselves from the risks, in large part by driving our climate policies even further, quicker. We must be far smarter with the energy we use and invest in home grown energy sources, such as new nuclear and renewables without delay[9]."

By 2025, the UK will be importing 57% of its oil up from 15% in 2010[10]. There has been no appreciable increase in global conventional crude oil output since 2005 despite increases in drilling rig activity (see Figure 5 and 6).

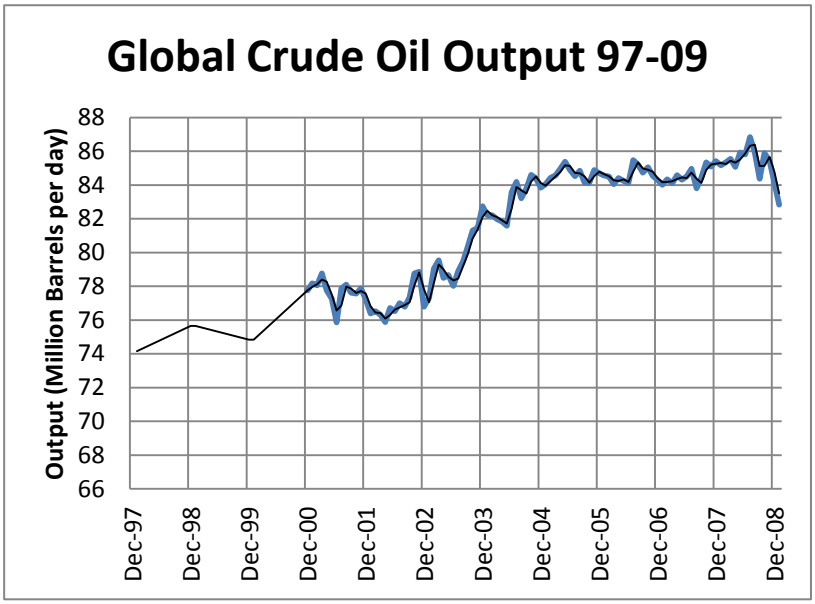


Figure 5: Global crude oil output between 1997 and 2009 (measured in million barrels per day). *Source: EIA, 2009.*

[8] DECC (2009). *Energy Security: A national challenge in a changing world. Report by Malcolm Wicks MP*. Available at: www.decc.gov.uk/en/content/cms/what_we_do/change_energy/int_energy/security/security.aspx

[9] DECC (2009). Energy Security […] Available at: www.decc.gov.uk/en/content/cms/what_we_do/change_energy/int_energy/security/security.aspx

[10] Analytical Annex, Table 19, *UK Low Carbon Transition Plan* (2009). Available at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

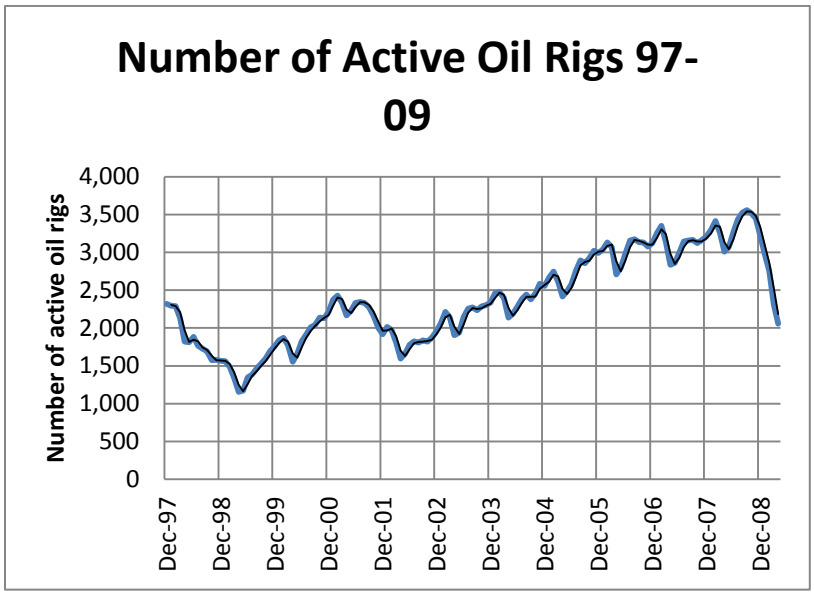


Figure 6: Number of active oil rigs worldwide between 1997 and 2009. *Source: EIA, 2009.*

The International Energy Agency (IEA) now believe that we will pass geological peak oil for conventional crude oil within 8 years, then all oil, including non conventional sources, within 18 years. The IEA also predict a supply crunch due to industry underinvestment in 2-3 years. It can also be seen from Figure 5[11] that we may already have reached the peak of conventional oil output, given that the amount of crude oil available worldwide has not increased significantly since 2005, despite demand and exploration growth.

Actual global crude oil output is limited by political and economic factors well before geological peak oil is reached. Many credible sources including several governments, independent expert bodies and major oil companies believe we will reach peak oil well in advance of IEA projections. We will see the economic impacts of falling global crude oil supply well before 2020; in reality, with an oil price spike of $147 in 2008, and current prices in excess of $125, we are already experiencing them.

Spikes in the price of crude oil (see Fig.7), followed by those in energy, food and inflation as experienced in 2008, will become more frequent and more severe, as global oil supply falls and competition for energy resources increases. The IEA has pointed out that any recovery of the global economy will inevitably lead to a recovery in oil demand and consequential steep energy commodity price rises.

These impacts will clearly have significant effects on the residents and the economy of Derby and Normanton.

[11] Data from the US Energy Information Administration (EIA): http://www.eia.doe.gov/

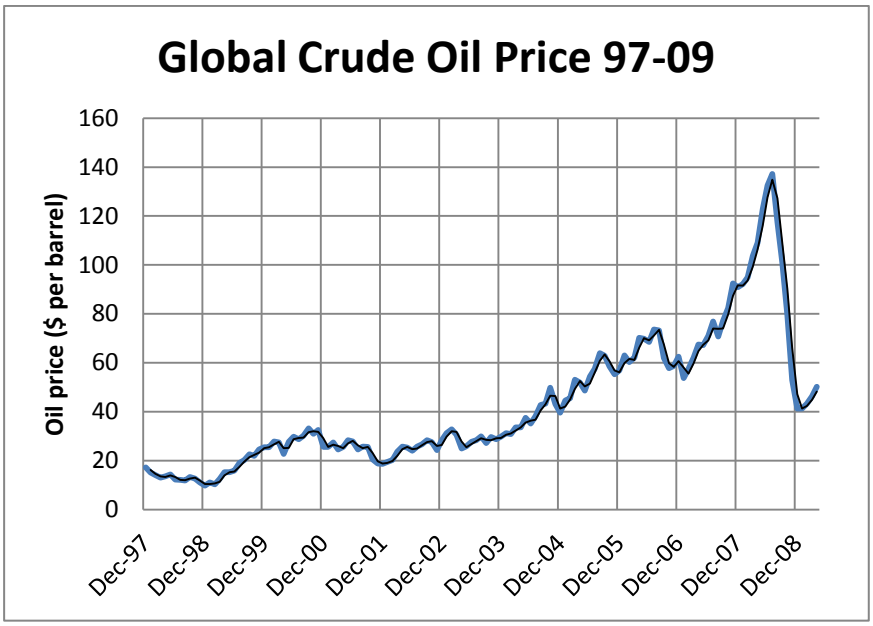


Figure 7: Global crude oil price between 1997 and 2009 (measured in $ per barrel). *Source: EIA, 2009.*

In the UK, over the coming 15 years, we also face a far heavier reliance on imported gas by 2020. Varying estimates suggest that the UK will be importing 45-80% of its gas[12] up from 31% in 2010. Gas prices and supply security in Europe have proved volatile in recent years with increased friction with Russia, Europe's largest single gas supplier. While the UK has recently increased pipeline connections to access Norwegian gas and has developed new supply agreements and infrastructure to import liquefied natural gas, we will still feel the sting of a cold wind blowing from Russia, if Eastern European gas supply is again restricted.

Peak oil and security of fossil fuel supply represent urgent cross cutting risks, with social and economic impacts from rising commodity prices, including inflation and potential further economic stagnation. A stable economic environment is essential, while we make the transition to a low carbon economy. This can only be achieved through intense work on energy efficiency, generation and low carbon sector growth work at the level of cities, communities and homes.

In terms of security of energy supply, the UK is also facing a potential electricity generation gap, as a significant proportion of the UK's electricity generating capacity needs to be replaced over the next 8 years. This is identified in the supporting documents to the Government Low Carbon Transition Plan[13].

[12] DECC (2009). Energy Security […] Available at: www.decc.gov.uk/en/content/cms/what_we_do/change_energy/int_energy/security/security.aspx

[13] *Implementation of the EU 2020 Renewables Target in the UK Electricity Sector*. RO Reform, June 2009. Available at: http://www.berr.gov.uk/files/file46778.pdf)

Under EU legislation[14] around one-third of the UK's coal and oil fired power generating capacity will need to be decommissioned by 2020. Several nuclear power stations are also due for decommissioning in the same timeframe.

The intention is to fill this gap by increasing the UK's gas powered generation in the short term and lifting renewable energy capacity from a current 5.5% to 28% over the next 8 years, largely from wind power.

This intensive investment required to increase the UK's renewable capacity almost five-fold over a 10-year period gives rise to concerns over spare capacity. By 2017 we can expect only 5-10% spare capacity, as opposed to 15% today. Unexpected power station shutdowns could have a more serious impact on the UK grid power supply. If the country cannot build wind capacity at the rates proposed, and the intended plant closures go ahead, then Derby, along with the rest of the country would need to plan for a far less reliable power supply from the UK grid.

Fuel poverty and energy costs

"The era of cheap energy is over"[15]. With peak oil and a heavier reliance on gas powered generation, we can expect further retail energy cost rises over the coming years, above those expected through the need to deliver the UK's low carbon transition. This will impact all fuel types including petrol, diesel, gas, electricity, oil, liquid petroleum gas (LPG) and even wood fuel costs as demand rises for alternatives. Recent rises in fuel costs to over £1.40 per liter are a testament to this.

Higher energy prices have had a universal impact but have been particularly severe on low income households in 'hard to heat' homes. These households spend a disproportionate amount of their income on fuel, and are said to be in 'fuel poverty' – a fuel poor household needs to spend more than 10% of its income on fuel in order to heat the home to an adequate standard.

The Governments Fuel Poverty Strategy set a target to eradicate fuel poverty by 2016. The unprecedented increase in the price of energy has put this target in doubt.

The latest **'Annual Report on Fuel Poverty Statistics' (DECC Oct 2009)** includes the following;

* Since the fuel poverty low of 2004, domestic energy prices have risen by 80% between 2004 and 2008, driving the trend in fuel poverty in recent years.

* Projections for England indicated a likely upper bound of around 4.6m households in 2009, up from 2.4m in 2006.

These figures represent a 90% increase in fuel poverty in 3 years, with a 21% fuel poverty rate for England.

[14] EU Large Combustion Plants Directive (LCPD) (LCPD 2001/80/EC). Available at: http://eur-lex.europa.eu/LexUriServ/site/en/oj/2001/l_309/l_30920011127en00010021.pdf

[15] John Hutton, business secretary-Sept 08

Energy prices have now been stabile for 2-3 years. With most price increases in response to Government policy and economic recovery. The Government estimates that, taken in isolation (i.e. before the impact of scarcity, competition and energy efficiency measures), the investment outlined in the national Renewable Energy Strategy will increase household electricity costs by 15% and gas costs by 23% by 2020[16]. Non-domestic bills could rise by up to 21%[17].

However, Ofgem's review of Britain's energy markets, Project Discovery[18] took market factors into account and models 4 different scenarios, of which their worst case scenario admits the possibility of the average annual bill rising from £1,247 in 2009 to £1,995 in 2016, a further 60% increase in domestic fuel bills. The other scenarios point to a more modest 14% to 25% increase above the level of inflation by 2020. With current rises in global energy costs the high price scenario now looks more likely.

Whichever model proves to be right we cannot escape rising energy cost. We can however minimise the impact through targeted energy efficiency measures and local generation.

The Government response to rising energy prices and fuel poverty is the extension of existing energy efficiency programmes and funding of new schemes.

The major existing schemes (CERT – Carbon Emissions Reduction Target - and Warm Front) are targeted to the basic measures of cavity wall and loft insulation, with heating repairs and improvements for the most vulnerable.

A major problem remains with existing solid wall properties as identified in the Government's Household Energy Management Strategy. This strategy outlines the need to insulate 7 million homes by 2020 with expensive solid wall insulation (i.e. more than 10 times the cost of cavity wall insulation).

The government introduced new measures including the Renewable Heat Incentive and the Feed in Tariff to push investment in renewable energy systems. The Green Deal and Eco, planned for later in 2012 are aimed at supporting households to make investments in solid wall insulation, lofts and boiler replacement.

The roll out of smart metering technologies should help householders manage energy use more closely.

[16] The UK Renewable Energy Strategy (2009). Page 19, Section 5.2. Available at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx
[17] The UK Renewable Energy Strategy (2009). Page 184, Section 7. Available at: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx
[18] Available at: http://www.ofgem.gov.uk/markets/whlmkts/discovery/Documents1/Discovery_Scenarios_ConDoc_FINAL.pdf

Climate change mitigation

Climate change mitigation refers to actions that reduce our contribution to the causes of climate change. This means cutting emissions of greenhouse gases (GHGs), such as carbon dioxide, through energy efficiency and using lower carbon transport and energy[19].

It is now widely accepted amongst the scientific community that if the world continues emitting greenhouse gases due to human activity at today's levels, then average global temperatures could rise by 4°C by as early as 2060 and up to 6°C by the end of this century[20]. Alongside frequent and unpredictable extreme weather events, these temperature rises will bring severe and permanent changes to regional climates with impacts on global economies and socio-political instability; resulting in growing conflicts, public health related deaths and migration of peoples. It is important to note that early action could prevent some of the worst excesses of climate change.

To avoid the most dangerous impacts of climate change, **average global temperatures must rise by no more than 2°C[21], and that means that global emissions must start falling before 2020 and then fall to at least 50% below 1990 levels by 2050. More recent science suggests that even rises of 1°C will lead to significant economic impacts.**

In recognition of the above, the UK has committed to cut its own greenhouse gas emissions by 34% from 1990 levels by 2020[22],. The UK will make an above average contribution within the EU, reflecting our relatively high income and by 2050 cut CO_2 emissions by 80%. This commitment has resulted in the Government setting detailed carbon budgets nationally and, effectively, for large organisations, through the Climate Change Act[23].

The City of Derby and Normanton Ward, will have to play their parts in achieving these challenging cuts. Action to reduce CO_2 emissions at local level will also help to reduce fossil fuel reliance and enhance energy security, create new economic opportunities and bring wider environmental benefits.

The direct and indirect dangers of climate change cannot be overestimated[24]. The window of opportunity to take effective action to avoid catastrophic climate change is rapidly closing. The

---

[19] http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=73&Itemid=186

[20] United Nations Environment Programme (UNEP) (2009). *Climate Change Science Compendium.* Available at: http://www.unep.org/compendium2009/

[21] At the G8 summit held in L'Aquila, Italy, in July 2009, world leaders agreed that the increase in global average temperatures should not exceed 2 degrees Celsius over pre-industrial levels by 2020. http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=593&ArticleID=6245&l=en

[22] Climate Change Act, 2008.

[23] Further details available at: http://www.hm-treasury.gov.uk/bud_bud09_carbon.htm

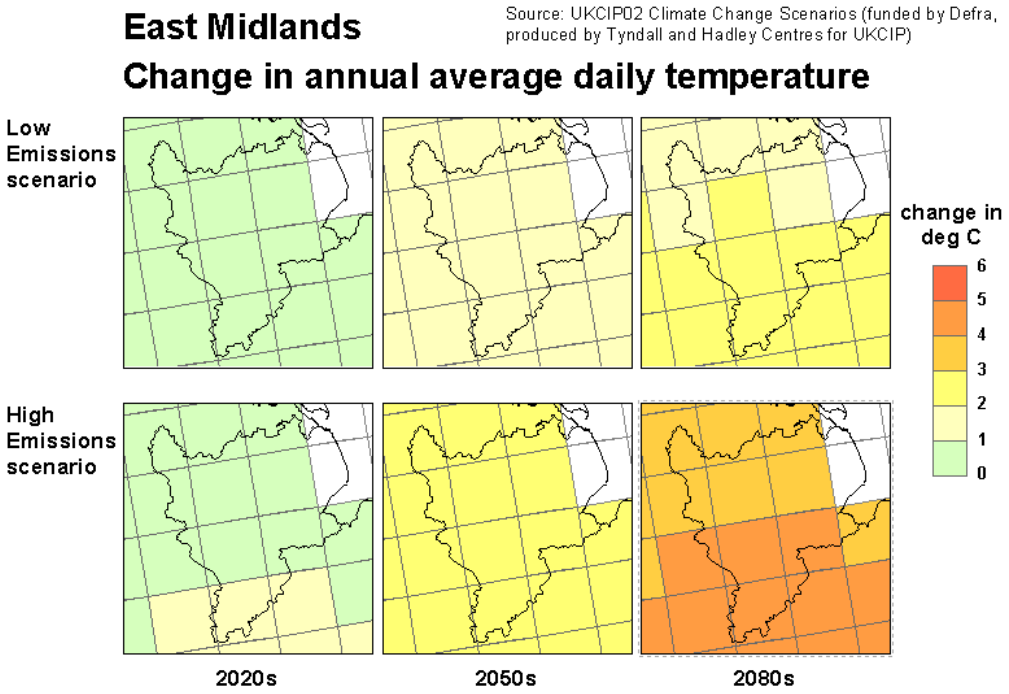
[24] In 2006, the Stern Review concluded that the costs of uncontrolled climate change could be in the range of 5% to 20% of global gross domestic product (GDP) per year, averaged over time.

consequences of inaction will endanger the livelihoods of current generations, and condemn generations to come to an uncertain future of widespread human adversity, ecological disasters and political, social and economic instability.

Climate change adaptation

Despite efforts to avoid dangerous climate change, the levels of greenhouse gases in the atmosphere are already sufficient to guarantee some level of climate change. Indeed we are already locked into around 40 years of unavoidable change[25].

The UK Climate Impacts Change Programme (UKCIP)[26] has predicted that the East Midlands will continue to get warmer, wetter and windier, with more storms and flooding in the winter and more droughts in the summer. This could have some very severe consequences for the city of Derby e.g. increased temperatures, evaporation and changing rainfall patterns would mean less water available from the River Trent and Derwent valley reservoir system, exacerbated by an increased likelihood of summer droughts and higher water demand for irrigation.



The actions we take now, if sufficient, will ensure that towards the end of the next 40 years the climate may start to stabilise. However we will still have to adapt to cope with some level of change, which could potentially affect all systems that support our current lifestyle and on which we directly depend, such as water supply, agriculture and farming, manufacturing, industry, transport, health provision, tourism and recreation, etc.

---

[25] United Nations Environment Programme (UNEP) (2009). *Climate Change Science Compendium.* Available at: http://www.unep.org/compendium2009/

[26] http://www.ukcip.org.uk/index.php?option=com_content&task=view&id=353&Itemid=408

Methodology

To ascertain the range and level of opportunities in Normanton we collected energy survey data from a significant random sample of homes in across the community.

This data was collected by telephone and doorstep survey, with a £150 prize reward offered to participants who were happy to share their property information.

Normanton is a fairly deprived area, with a significant community of speakers of other languages, as such it has been difficult historically to obtain responses to mail outs. NEPs approach was to focus on door knocking and direct contact with householders.

NEP were also able to offer the potential for households to receive a £130 Warm Homes Discount, as assessor have been trained through an OFGEM programme to be able to refer residents for this, undertake home energy surveys and advise on energy saving.

Initially a mail out to 4,000 homes delivered by 1st class post for the 1st 400 homes followed by hand delivery for the next 3,600. The mail out was followed by the door knocking by our team of 10 Warm Homes Assessors, starting in the North end of Normanton.

The results from the initial doorstep surveys offering the 1 hr Warm Homes energy advice and survey was very poor, with only 20 surveys eventually undertaken from 900 homes visited.

Direct contact between Derby City council and local residents groups elicited a further 25 or so surveys.

Our final option was to send in a smaller team of experienced NEP doorstep assessors to undertake 5minute doorstep surveys paid on outcome. We sent in 3 surveyors over a 6 day period. They were able to collect 170 further surveys starting from the South and centre of Normanton.

Our final tally was 220 surveys completed

With the required change of methodology, the randomness of the samples was compromised and the sample size was lower than target, however the data sat is valuable and sufficient for extracting useful archetypes and some broad assessments of the energy opportunities in Normanton.

We have processed this data to generate energy, carbon and stock condition reports for all the homes surveyed. We compared the data to known reference points from other data sets, to ensure that the sample was fairly statistically representative. The data was then extrapolated for the whole community.

We have used the building stock data collected to identify building archetypes and to identify and suggest home and building improvement programmes and where appropriate potential funding routes

We have also examined local energy, infrastructure and human resources in the contexts of the local socio economic background to identify community specific opportunities for energy and carbon saving programmes.

To achieve this we:

1. Produced appropriate survey materials in print for mail out . These were developed with Derby City Council and the Normanton Neighbourhood Board. Hand delivery of materials was selected as the lowest carbon delivery method. Cycle courier was explored as an option, however the couriers were not available over the period required.

2. Collected sample homes data from respondents to generate home energy profiles. over 200 responses were received to a mail out of 4,000, and intensive door to door knocking and home visits. About 2,000 doors were knocked on. This is a 5% response rate of on letters and 10% on knocks.

3. Analysed local trends and data to identify archetypes and trends in stock and energy data, related these to other locally available data sets.

4. Further analysed local socio-economic data to produce area wide energy and sustainability opportunity reports

5. Identified of key projects and opportunities linked to local need and resources and where suitable national, regional and local initiatives, support and funding.

6. Presented reports to local communities for discussion and input at an engagement event.

Limitations and Assumptions

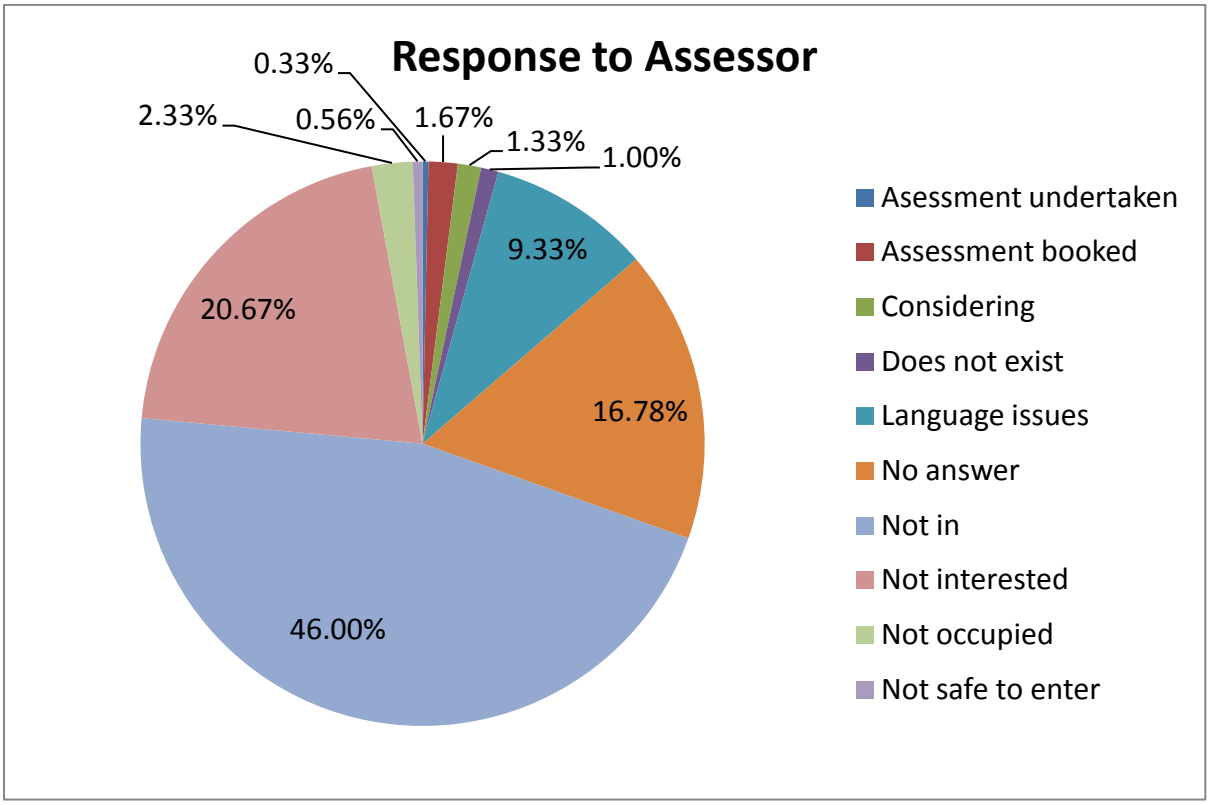
Initially it was hoped that a mail out to 4,000 homes followed by visits from our 10 strong Warm Homes assessor team would illicit around 400 responses, about 20 responses were received through this route. Further local engagement events attracted 25 more responses. To lift this over 200, we sent in a surveyor team to knock on doors in the Normanton area. Our surveyor team increased the total to 220.

We had to stop collecting responses at this point to ensure we had sufficient time to process and analyse the resulting data.

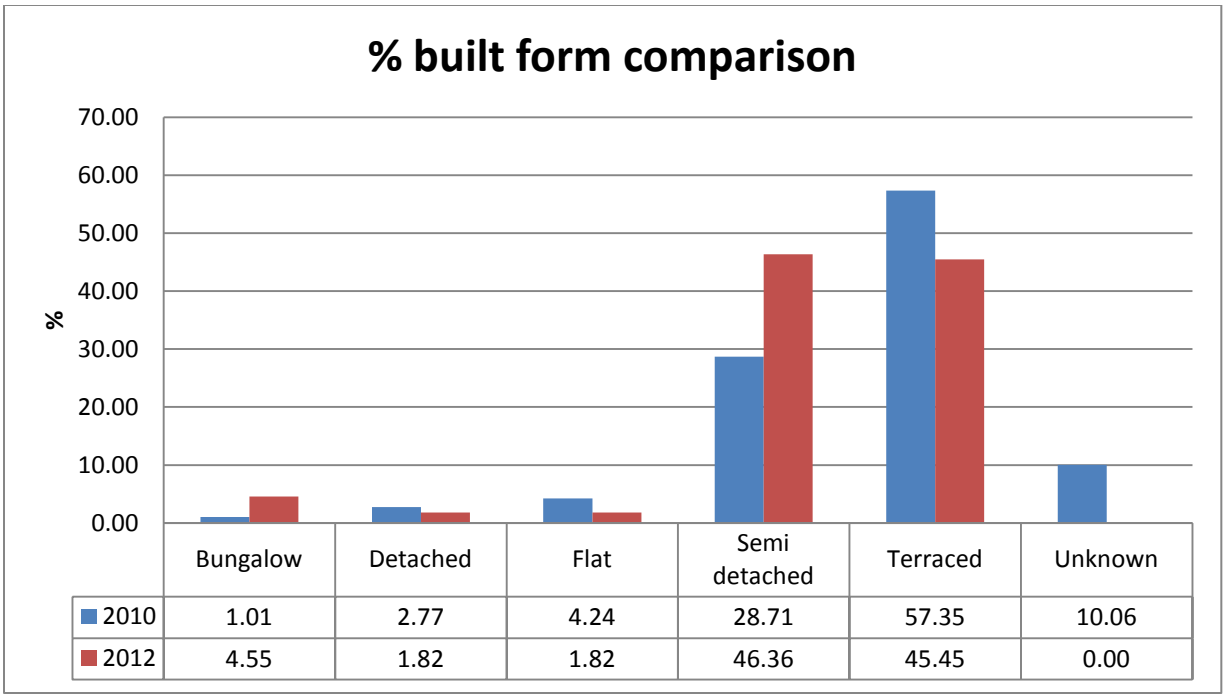
The typical responses from residents were ‘not in’ 46% or ‘no answer’ 16.8% with a large number of ‘not interested 27.7% and ‘language issues’ 9%

Only 2.2% of those contacted by mail and followed up with a visit invited the surveyor in.

Many of the 'not in' and 'no answer' responses were from homes where residents would simply not open the door to the assessor.

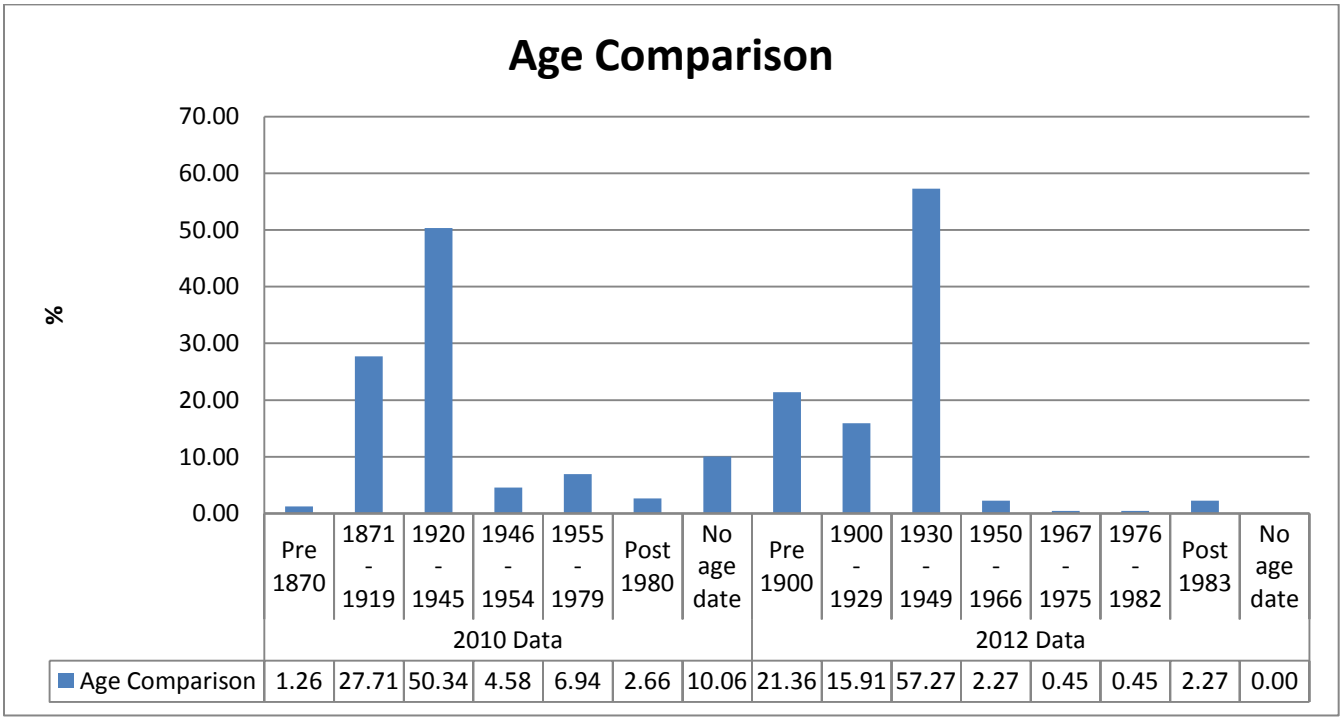


The resulting data was compared to another 2010 reference data set from Experian to check that the collected data was representative of the built form of properties in the area. Due to the need to undertake door to door assessments and the high no response rate the sample is slightly skewed away from the terraced homes to the semidetached. We will compensate for this in extrapolating data



	Bungalow	Detached	Flat	Semi detached	Terraced	Unknown
2010	1.01	2.77	4.24	28.71	57.35	10.06
2012	4.55	1.82	1.82	46.36	45.45	0.00

While 400 would have generated a better statistically significant sample it can be seen from the above that the sample is fairly representative of the Normanton area. We have worked to link the 220 surveys to building archetypes to get an impression of the numbers of each type of building across the area and an estimate of the opportunity in terms of energy saving works.



	Pre 1870	1871 - 1919	1920 - 1945	1946 - 1954	1955 - 1979	Post 1980	No age date	Pre 1900	1900 - 1929	1930 - 1949	1950 - 1966	1967 - 1975	1976 - 1982	Post 1983	No age date
	2010 Data							2012 Data							
Age Comparison	1.26	27.71	50.34	4.58	6.94	2.66	10.06	21.36	15.91	57.27	2.27	0.45	0.45	2.27	0.00

A comparison of stock age data with the Experian 2010 analysis of 2001 census data is a little more difficult as the age ranges collected were different to those required for energy analysis. Energy analysis data has to be collected against the age bands that correspond to changes in building regulations. The broad spread though seems largely comparable.

Normanton community

This information is taken from the draft **Neighbourhood Overview: Normanton, *Derby City Council***

Normanton neighbourhood is situated south west of the city centre, covering approximately 227 hectares and is surrounded by the urban area of the city. It borders the wards of Arboretum, Sinfin, Blagreaves and Abbey. The ward is divided by the ring road with the Peartree area to the north and Austin / Sunnyhill to the south. Access is predominantly along the Stenson Road and Sinfin Lane transport corridors, incorporating St Thomas Road and Peartree Road. The population of the ward was estimated as 16,193 at 2007; however estimates suggest the figure could be nearer 17,602.

In terms of population, residents of Normanton are generally younger than many other areas of the city. It is one of the most diverse wards in the city and there are thought to be in the region of 123 nationalities represented in the ward, including nationals from Pakistan, India, Slovakia, Poland, Iraq, Czech Republic, Jamaica and Afghanistan. Evidence also suggests that Normanton is home to a number of new migrants, with approximately 2,760 new migrants moving to the area between 2002 and 2007. There is also a diverse range of religions represented in the area, with large numbers of Muslims, Sikh's and Hindu's residing in the area.

The Normanton area is thought to have been the site of one of the major Viking settlements in the Derby area. The original village lies just south of the modern ring road, its main thoroughfare commemorated by the present day Village Street. The area began to rapidly urbanise in the mid 19th century and subsequently much of the housing stock is typical red brick, high density terracing.
The area was eventually absorbed by the expansion of Derby's boundaries in the 1930s. Less than 1000 new homes have been completed in the area since 1940. In total there are 6,407 households in the area.

The area is largely residential with supporting facilities such as primary schools, open spaces and retail locations. Foresters Leisure Park is also within the area and includes a Showcase Cinema, MegaBowl, Gala Bingo, KFC and Pizza Hut. The Cavendish is only district centre within the area and provides a modest range of convenience retail uses. Parts of the area are also well related to the Normanton Road district centre, which provides a wider range of shops and facilities but is just outside of the ward. There are no secondary schools located within the ward.

In terms of regeneration, the main opportunities relate to improving the existing housing stock. There are significant issues in terms of housing condition, the proportion of vacant dwellings and the variety of

housing types in the area, which all need to be considered. There are few vacant brownfield sites within the area, although the former Normanton Junior School site is currently available.

The proportion of residents working within the city is well above the average of other wards and subsequently the proportion of residents travelling to work by car or van is lower than other areas. However, the increasing dominance of journey to work by private motor vehicles has influenced the level of congestion along the Stenson Road corridor. Consultation responses have suggested that congestion is a significant issue in the area.

There are no areas of green belt or green wedge within the ward, however there are a range of important open spaces dispersed throughout the area including Normanton Park and Sunnyhill Recreation Ground.

In terms of deprivation, Normanton is the second most deprived ward in the city and educational attainment is generally lower compared to other parts of the city.

Approximate Area: 226 hectares1
Population Estimate: 16,1932
Number of Households: 6,407

Estimated Population Density: ONS data suggests that population density within Normanton is well above the level experienced across the city as a whole and is the highest of any of the wards in the city.

Household Composition: The proportion of one person households in Normanton is slightly above the average proportion across the city as a whole. The proportion of married couple households is noticeably below the average level. The proportion of lone parent households is above average.

Housing Age: Prior to 1900 there were nearly 2400 residential properties located within Normanton. Significant housing expansion in the ward continued from 1900 to 1940, through the development of a further 2900 homes. Since 1940 expansion has slowed and less than 1000 homes have been completed since then.

Housing Types & Tenure: 52% of the housing stock in Normanton is terraced, compared to a city average of 25%. Detached properties only contribute 5% of the housing stock compared to an average of 23%. The proportion of semi detached properties is below average, whilst the proportion of flats / maisonettes is close to the average.

The level of outright owner occupation is similar to the city average whilst owner occupation with a mortgage is well below average. The proportion of properties rented from the Council, housing associations / RSL's and rented privately is above average.

2012 Information from CACI ltd suggests 81.4% home ownership, 18.1% LA rental and 0.5% private rented. This information is not bourn out by our sample, which has been cross referenced against known social housing. Information provided by Derby homes. Our data shows that DCH manage 817 properties in Normanton, 12.8% of the homes in the area, there may of course be more operated by other social landlords such as Spirita. Private rental made a far higher proportion of our sample, 32% of homes visited. Owner Occupiers however made up 53% of the households. This could suggest a very large number of unregistered small landlords. This clearly has important implications for the role out of any area wide energy efficiency programme.

House Sizes: Proportionately there is a prevalence of homes with 5 and 6 rooms within Normanton. The proportion of houses with 8 or more rooms is below average.

Housing Condition: The proportion of dwellings classed as non decent or in disrepair within Normanton is amongst the highest in the city and is similar to wards such as Abbey.

Communal Establishments / Care Homes: There were 185 nursing home places and 40 residential home places for older people in Normanton at March 2009.

Educational Provision: There are three schools within Normanton including, Dale Community School, Hardwick Primary School and Village Primary School.

Household Income: The average household income in Normanton is below the city average by approximately £6,100. The proportion of households with an income less than £15,000 is approximately 27.6% which is well above the city average and is amongst the highest in the city. The proportion of residents working in managerial, professional and senior professions is well below average. The proportion working in processing and elementary occupations is above average.

Employment: There is very little industrial and commercial activity within the ward itself. There is a small amount of commercial activity centred on the Peartree Road and Cavendish areas and a small area of industrial activity in the Princes Street area. There are substantial areas of industrial activity surrounding the periphery of the ward inlcuding S&A Foods located on Shaftsbury Street and the Rolls-Royce works on Sinfin Lane and Victory Road.

Unemployment and Benefits: Unemployment within Normanton is above the average citywide level and is the second highest of any ward in the city. The proportion of residents claiming one or more DWP benefit is 22.9%, which is the third highest level of any of the wards.

Key Points:

- **Retail:** Research has shown that a significant proportion of convenience expenditure originating from the Normanton area is spent outside of the ward, predominantly in the Sinfin area;
- **Facilities:** There is no secondary school or further education establishment in the ward. Some households are up to 30 minutes public transport / walking travel time from these facilities;

- **Housing:** The proportion of terraced homes is nearly double the average across the city. Subsequently the proportion of semi detached and detached homes is below average, most notably detached homes, which only contribute 5% of the stock. Owner occupation with a mortgage is also below average. The number of vacant dwellings is high whilst the proportion of non decent dwellings is also high. In general, evidence suggests that the area is not a particularly desirable residential location at the current time;
- **Regeneration:** Given the quality of the housing stock, the main regeneration opportunities relate to improving the existing supply, rather than expanding it. The former Normanton Junior School and Normanton Mills complex may provide development opportunities;
- **Schools Capacity:** Dale Community School has a shortfall of places, whilst Hardwick and Village Primary Schools have a surplus of places;
- **Congestion:** The Stenson Road corridor experiences medium / high delays caused by congestion as it passes through Normanton, whilst there are specific congestion hotspots in the area, notably along the ring road and at the Cavendish;
- **Air Quality:** An AQMA covers the ring road as it passes through the ward
- **Population:** Population density is higher than any other ward in the city. The population of Normanton is younger than the city profile with a high proportion of children and residents under 40. High proportions of residents are from varied ethnic + religious backgrounds;
- **Deprivation:** Normanton is the second most deprived ward in the city;
- **Crime:** The proportion of residents that think that crime levels in the local area need improving is above average;
- **Education:** Attainment is generally lower than other parts of the city;
- **Economy:** There is very little industrial and commercial activity located within the ward and household income is lower than the average. Unemployment is high and the proportion of residents claiming benefits is also higher than average;

Religion (from 2001 census data)

Religion	Number	%
All People	13494	100%
Christian	5738	43%
Buddhist	34	0%
Hindu	263	2%
Jewish	10	0%
Muslim	2919	22%
Sikh	1904	14%
Any other religion	28	0%
No religion	1664	12%
Religion not stated	934	7%

Fuel poverty in Normanton

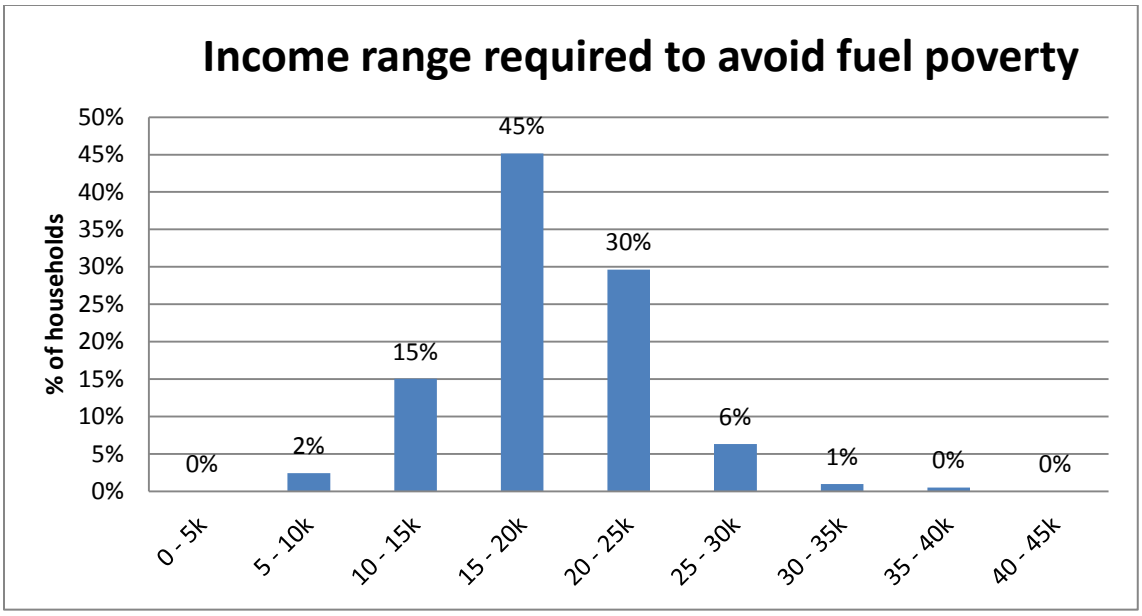
As detailed above household income is lower than the average in Normanton. Unemployment is high and the proportion of residents claiming benefits is also higher than average. Normanton already has a high number of households experiencing fuel poverty. Rising energy costs and the prevalence of solid walled properties is further increasing the prevalence of fuel poverty. Consequently Normanton is one of the most fuel poor areas in Derby

The Department of energy and Climate Change have undertaken an assessment of this issue by area. The areas assessed are Lower super output area. See Appendix 2 for the geographical splits of these areas.

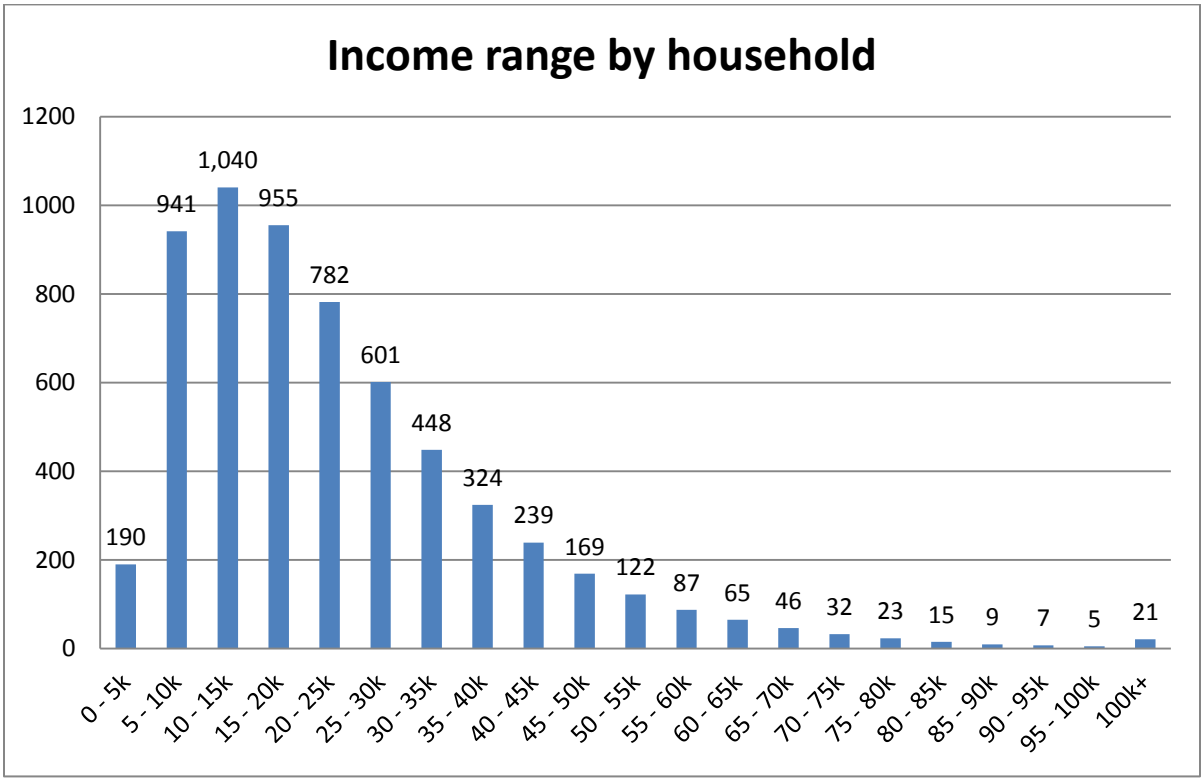
The distribution of fuel poverty across these areas is detailed below.

Ward	Lower Super Output Area (LSOA) Code	LSOA name	No. Households	No. of households fuel poor	% of households fuel poor
Normanton	E01013565	Derby 016D	450	139	31
Normanton	E01013566	Derby 016E	615	195	32
Normanton	E01013567	Derby 020B	504	164	33
Normanton	E01013568	Derby 020C	627	184	29
Normanton	E01013569	Derby 020D	500	153	31
Normanton	E01013570	Derby 023A	618	174	28
Normanton	E01013571	Derby 023B	608	162	27
Normanton	E01013572	Derby 023C	658	112	17
Normanton	E01013573	Derby 023D	687	165	24
Normanton			**5,267**	**1,448**	**27.49**

Based on energy surveys, the average income required to avoid fuel poverty in Normanton is £18,800.



The majority of households earning less than £15K in Normanton will be in fuel poverty. In Normanton that constitutes 2171 homes or 35% of the population. From the chart above it can be seen that a good proportion of those earning between £15 and £25K may also be in fuel poverty, if they heat their homes fully., This suggests that DECC estimates for fuel poverty in Normanton are possibly conservative or ,where local area household energy use data has been drawn from utilities, mask the fact that some homes may avoid fuel poverty by not being adequately heated.

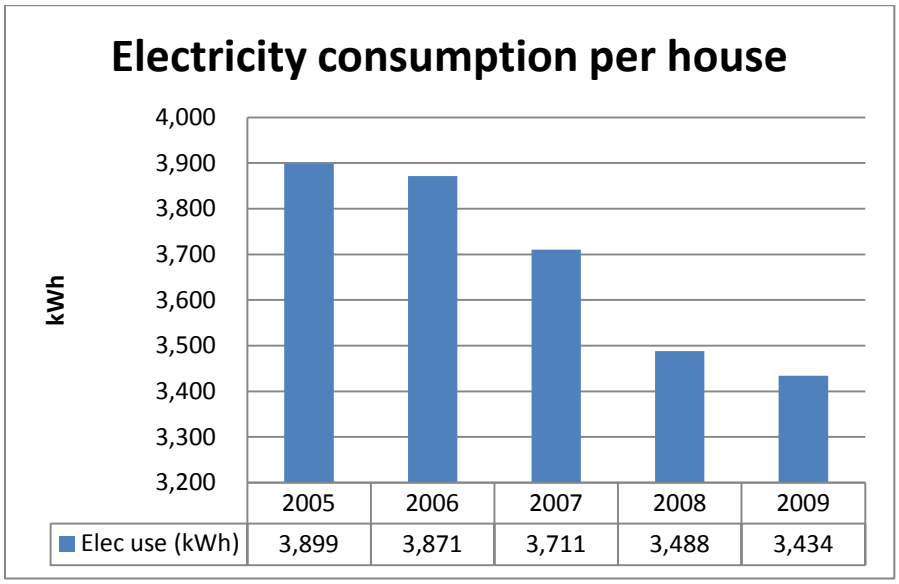


Carbon and energy trends

Data on energy use from meter readings is supplied by utility companies to the Department of Energy and Climate Change (DECC) this data is currently available up to 2009 down to Middle layer Lower Super Output Area level around 3-4000 homes) There are 3 MLSOA areas that cross Normanton, Derby 016, Derby 020 and Derby 023.

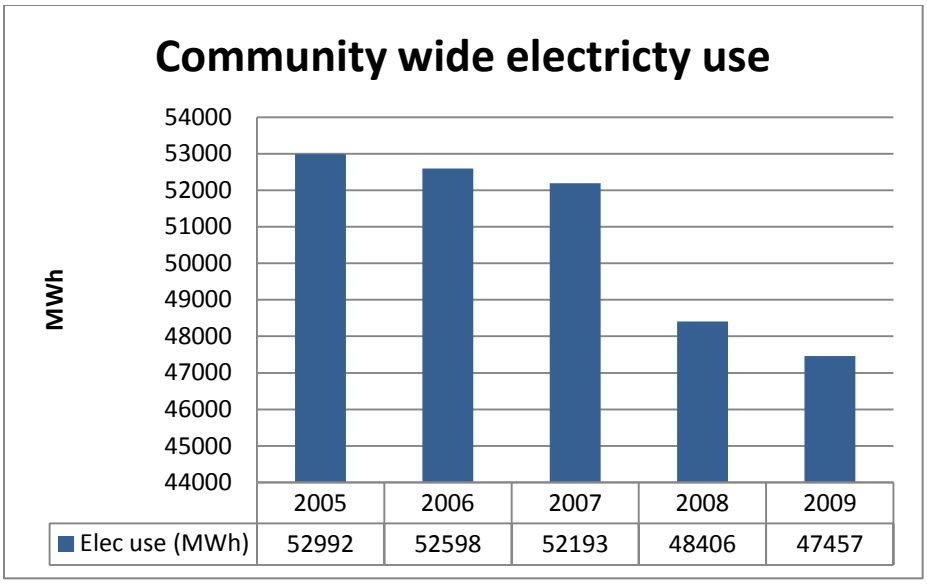
Analysis of the 5year trends in energy use per dwelling and across Normanton community shows steadily declining energy consumption. Domestic electricity use has fallen about 12% between 2005 and 2009 (the most recent year for which there is data) to around 3,434 kWh per house in 2009.

Electricity use fell significantly between 2007 and 2008, probably due to the significant jump in electricity process in 2008. Retail electricity prices jumped 10.6% January to February 2008 and again by 10.3 % August to September 2008[27]. This was likely to have driven a fast response in behavior change and increase investment in energy efficient appliances and low energy lighting.

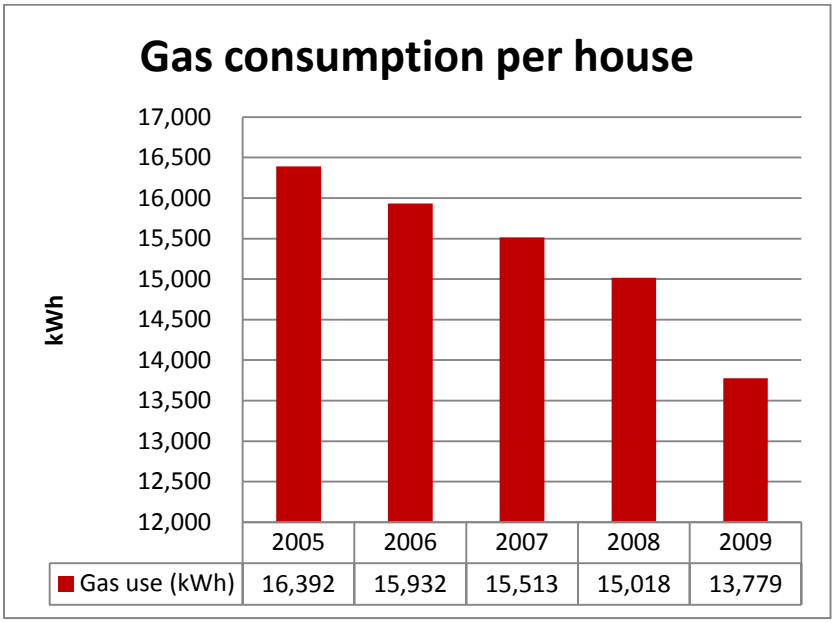


Across the whole community, including commercial electricity use electricity consumption has also fallen markedly since 2005 with a strong decline from 2007. Community energy use is largely a factor of domestic consumption in Normanton, as there is little industry or public sector consumption locally.

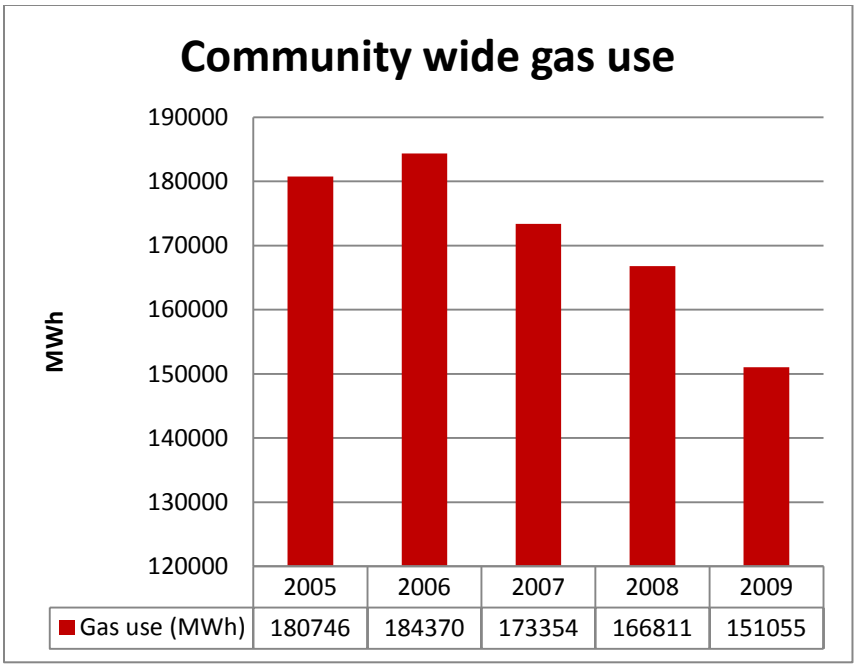
[27] Table 2.1.3 Retail prices index: fuel components, monthly figures, DECC July 2009



Domestic gas use has also continued to fall steadily since 2005 as boilers are replaced and lofts are insulated. Similar to electricity, an increase in efficiency accelerated following 2008 probably due to rising gas prices followed by investment in loft insulation and boiler replacments. Over the 2005 to 2009 period domestic gas use has fallen by just under 16%.



Community wide, gas use has fallen at the same rate as domestic gas use after peaking in 2006.



Overall car bon emissions in Normanton have fallen by about 13.7% since 2005.

Data collected

Data was collected from 220 homes the geographical spread of which is indicated on the map in Appendix 2

We collected sufficient data on building fabric to calculate energy profiles for each property surveyed and also to extrapolate an energy profile for the area. We can also extrapolate the likely number and types of measure that are available to take forwards to reduce Normanton's energy use

2010 Data from Experian is available across the 42 Census Output Areas (COA)

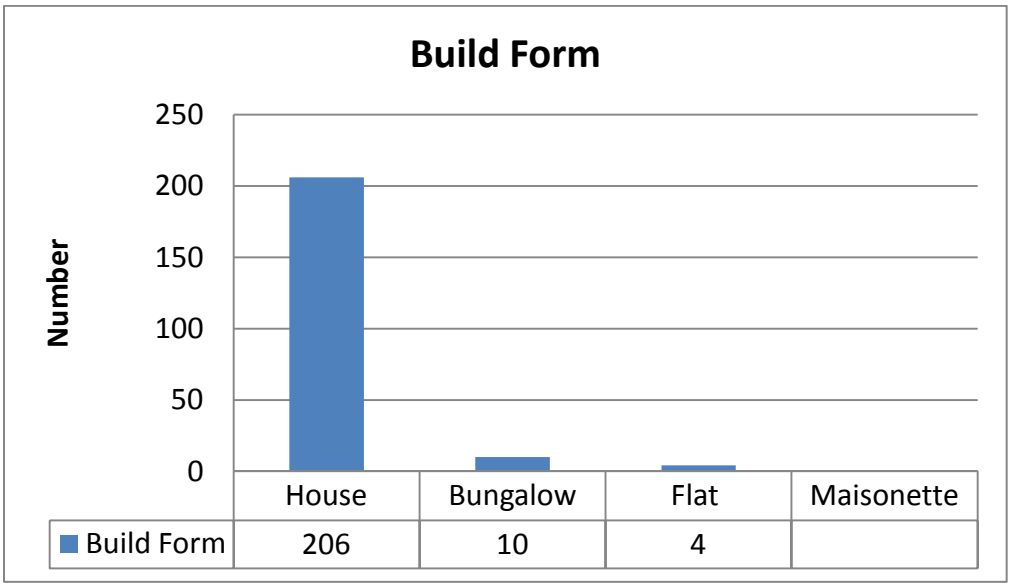
Data	Value
Households	6388
pre 1870	77
1871-1919	1700
1920-1945	3088
1946-1954	281
1955-1979	462
post 1980	163
No age data	617
Bungalow	62
Detached	170
Flat	260
Semi	1761
Terraced	3518
Unknown type	617
Property CO2 kg	28245.48
Transport CO2 kg	7060.739
Total CO2 kg	35306.22

Normanton housing stock

There are about 24million homes in the United Kingdom. Of these 21.8million are in England, comprising 29% terraces, 27% semi-detached, 17% detached, 9% bungalows, 3% converted flats and 14% purpose-built flats (DCLG, 2007). So, unlike many countries, the vast majority of dwellings in the UK are houses—86% in England. The stock is also fairly old. In England, 39% predate 1944, 42% were built between 1945 and 1980 (when thermal standards we re-raised significantly) and 19% after 1980. It is estimated that around a third of dwellings which will comprise the2050 stock have yet to be built, and that by the same date 75% of the currents tock will still exist. (Wright, 2008)

According to Owen (Owen, 2006), 83% of energy use in the home is accounted for by space and non-electric water heating, and the vast bulk of this is done by gas. The remainder is accounted for by electricity use for other purposes, including electric water heating.

6.1 Build form and age

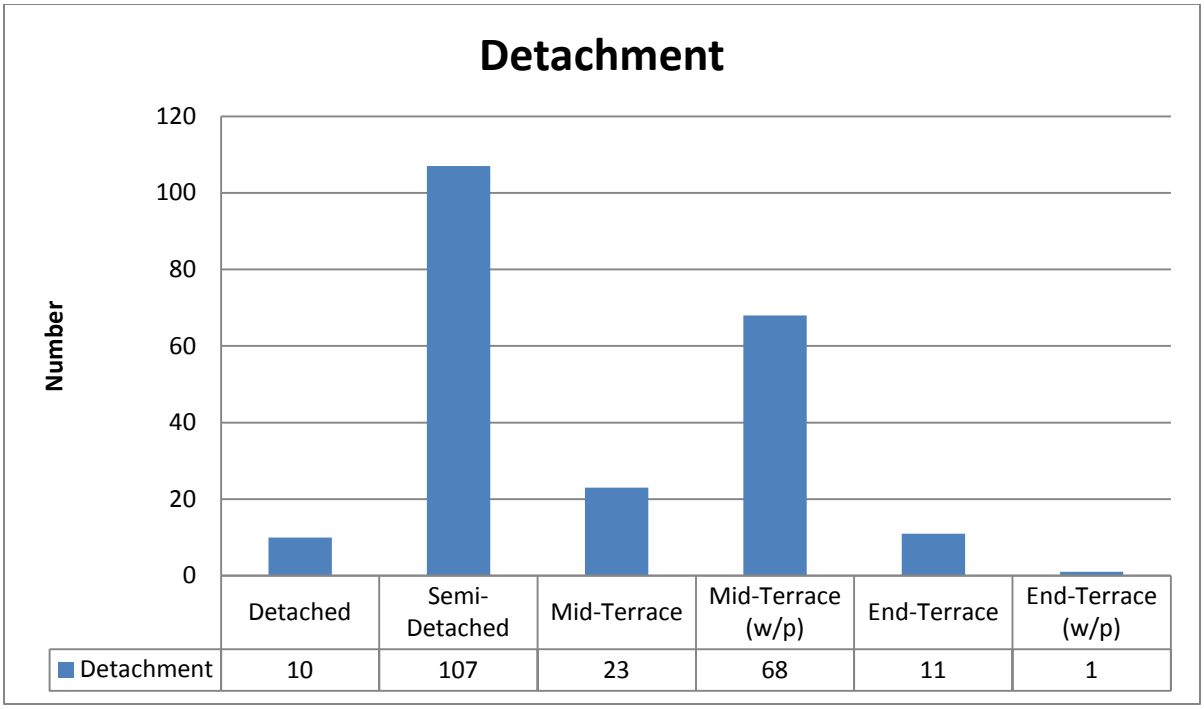


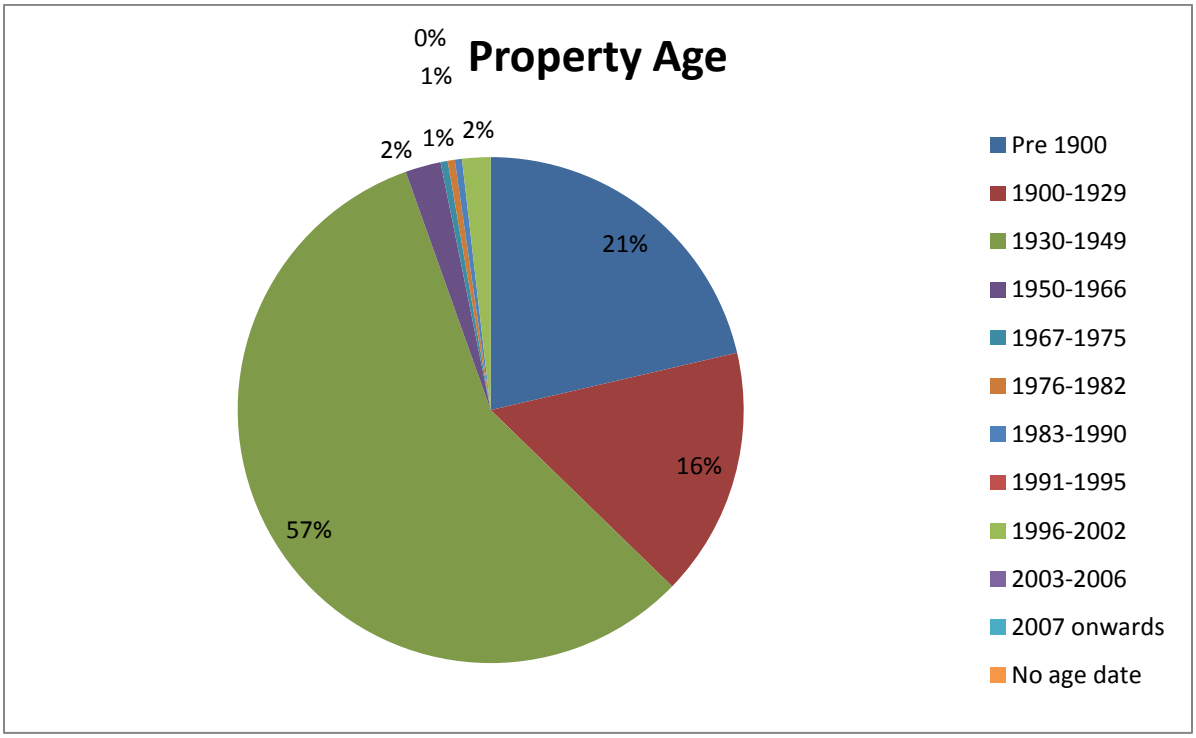
The vast majority of homes in Normanton are houses with a far smaller number of flats and bungalows and no maisonettes in our sample. Of all the homes in the sample the majority are terraced or semidetached. There are a large number of mid terraced homes with passages which makes them less thermally efficient that homes without passages as there is a larger heated perimeter, ie a larger area of external wall through which to lose heat.

The main opportunity in Normanton is clearly from solid wall insulation

As terraced houses with passage are a significant proportion of the terraced properties it is worth looking at other areas where this type of property has been retrofitted for solid wall insulation. A

refurbishment project in Sheffield worked with just this type of property. The case study is published by the Energy Savings "Sheffield Eco terrace; A refurbishment case study"



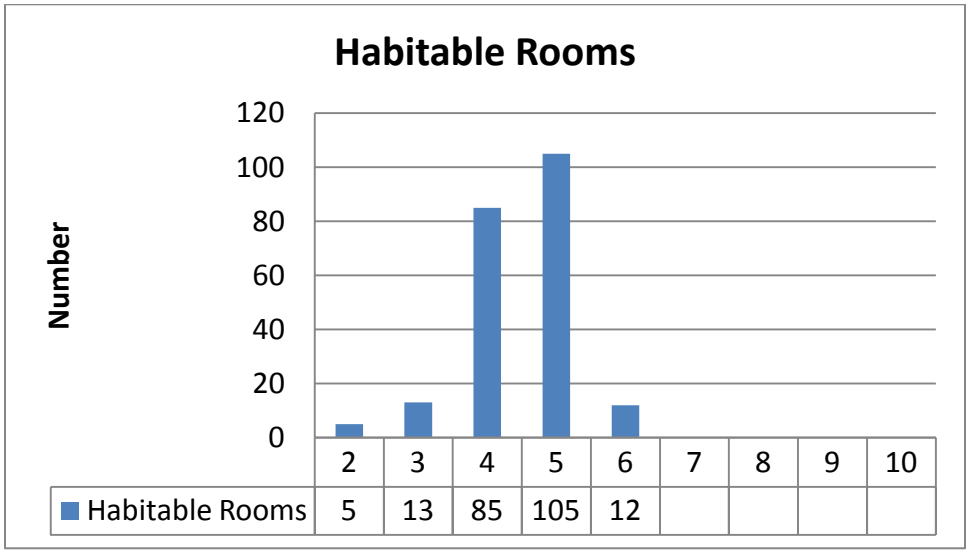


Property age reflects the building regulations prevalent at the time in the thermal properties of the building fabric. Most homes built prior 1930 will have solid walls, In Normanton all homes prior to 1949 also have solid walls

The 3 most significant age clusters in Normanton, pre 1900, 1900-1929 and 1930-1949 .From the early 1980s all homes would have had cavities as this was enforced through building regulations, however, very little building has happened in Normanton since 1949

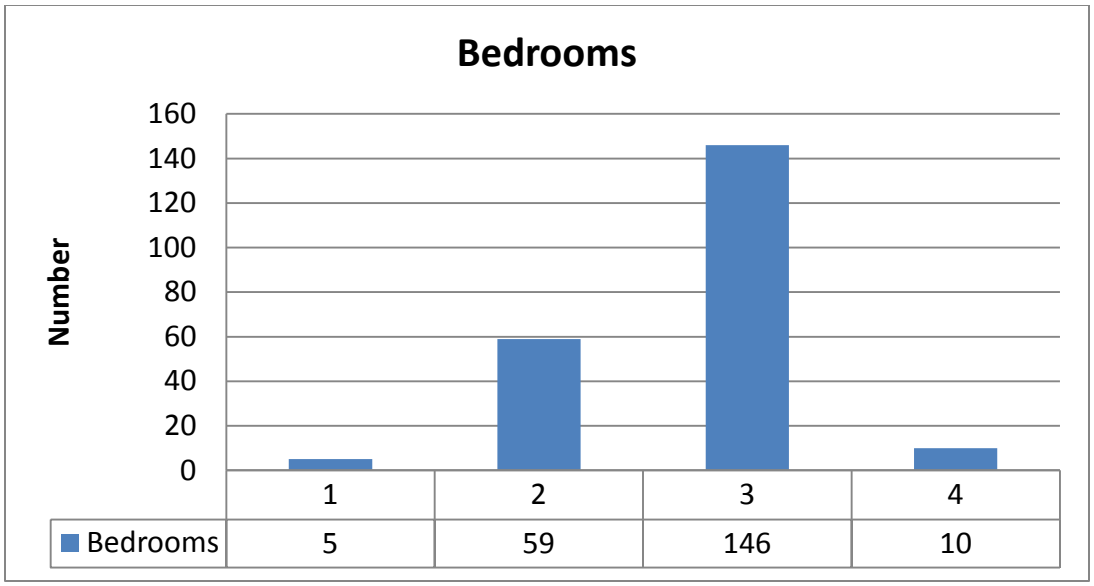
This spread of ages suggests that this community of properties will be expensive to achieve significant improvements on 'as built'thermal performance. With the relative incomes of households in the community opportunities will also need to be provided, fully or significantly funded through schemes like the Eco to ensure take up.

6.2 House size

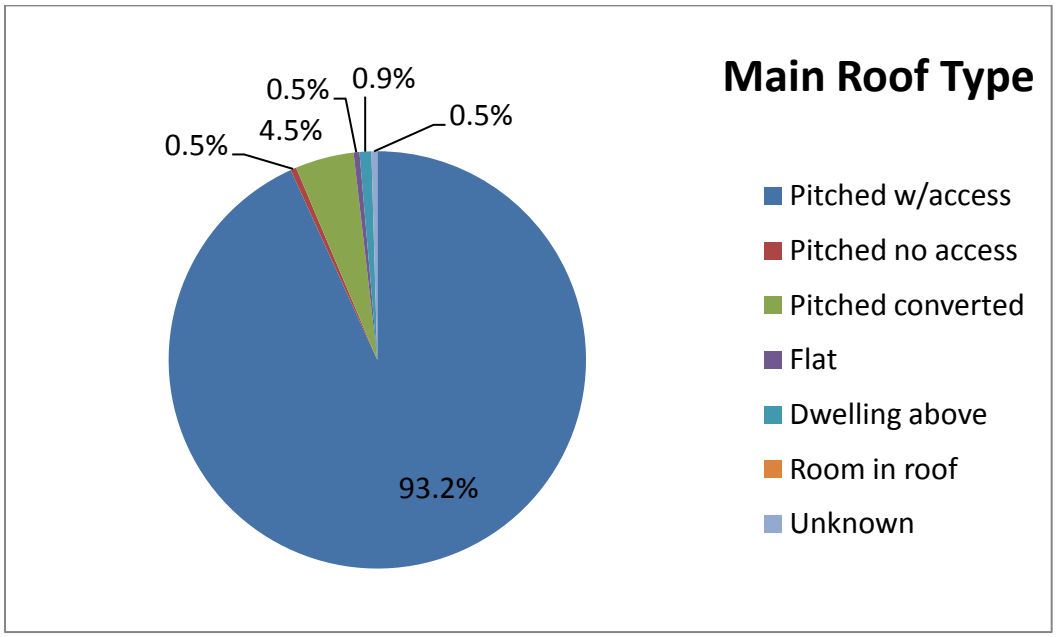


Houses in this area are generally smaller than average, alongside the prevalence of semi-detached and terraced properties. This however along with the prevalence of solid walled properties suggests that energy use will be higher than average. Smaller numbers of rooms and a larger non working population who are likely to be home during the day, would suggest again that energy use through space heating may well be higher than average.

With the likelihood of longer occupied hours, thermal insulation will show better savings than typical homes

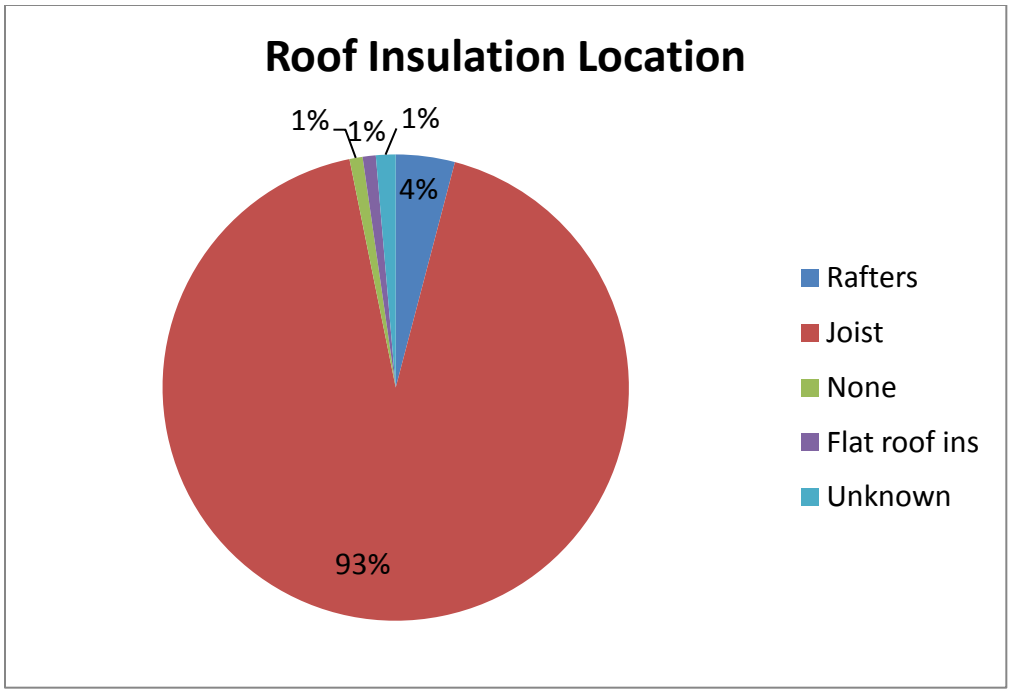


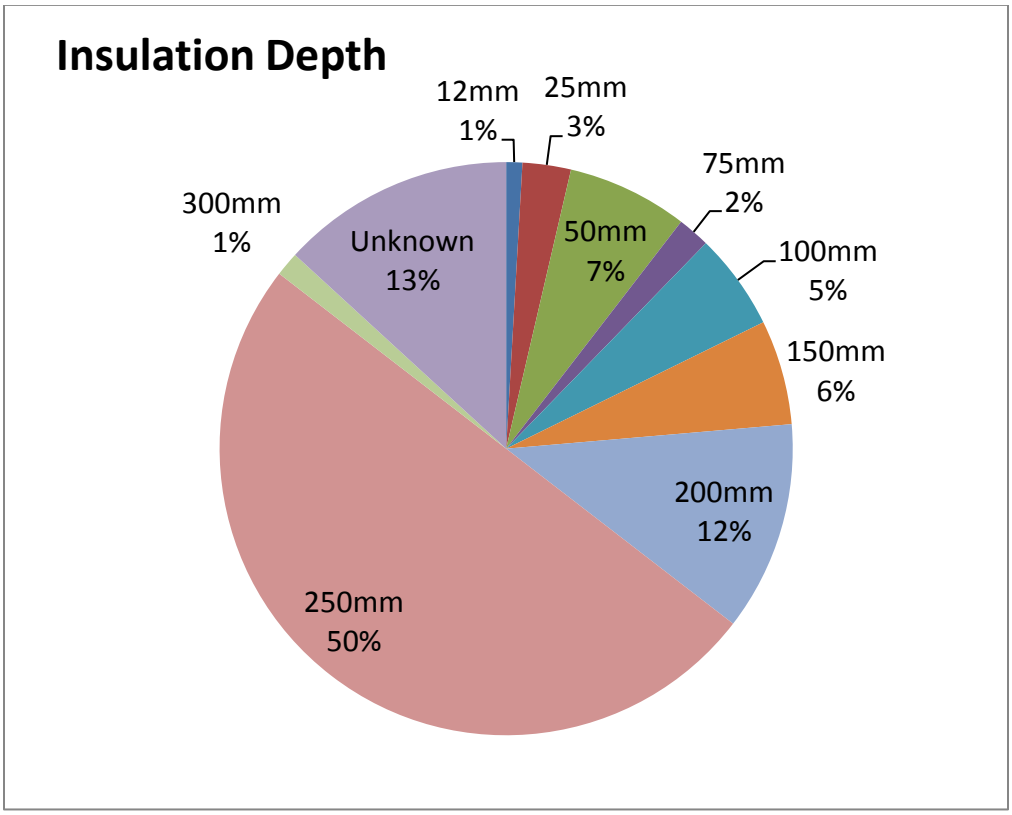
6.3 Roofs



The vast majority of Normanton roofs are pitches with access, with a significant minority having been converted into additional living space.

The vast majority of these roofs have some level of insulation, either between joists .





Most homes (62%) have 200mm or more of loft insulation, This will be as a result of intensive programmes to promote lofty insulation in the area. 18% of homes still have 100mm or less. A smaller

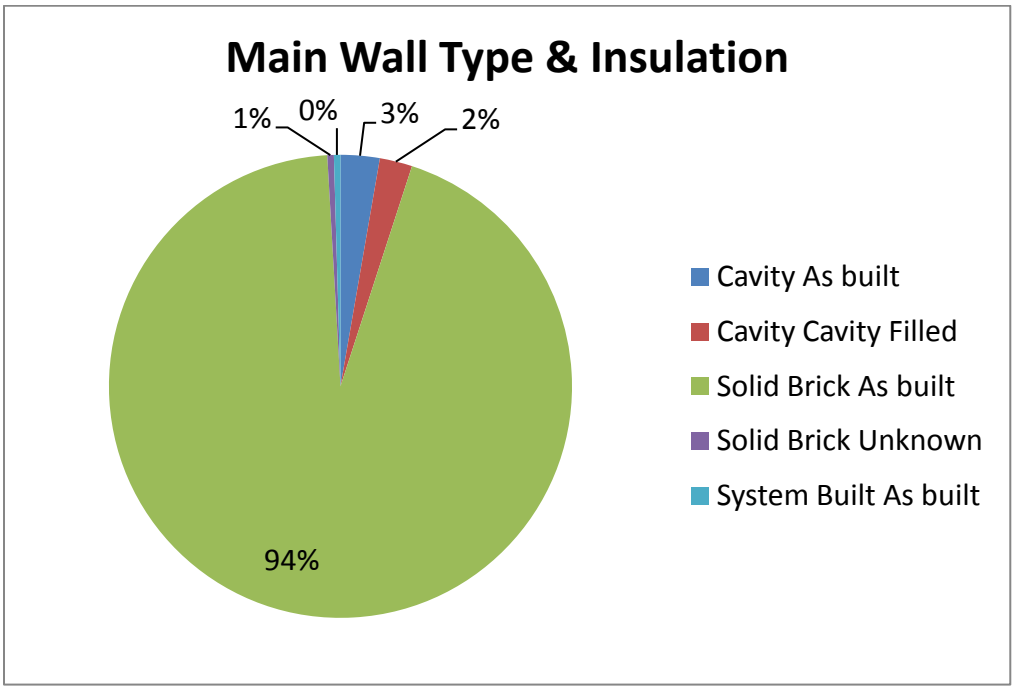
number (13%) have less even than 75mm. There is still some opportunity for saving carbon emissions and reducing energy use here.

The local reasons for residual uninsulated lofts should be explored. Often roof spaces are used for storage and the inconvenience of emptying lofts for insulation, or the additional costs and loss of space from raising joists can be impediments to taking up the opportunity to install loft insulation.

Solutions could be include:

- **Incorporating work with local builders on raising joists into local energy efficiency schemes.**
- **Checking whether incorporating this work into insulation works would show a good return on investment if included in the costs finance packages to encourage increased take up.**
- **Establishing local community volunteer loft clearance schemes**
- **Working with trusted local agencies such as age concern, mosques. temples or community groups to offer loft clearance**

6.4 Walls



Very little work has already been undertaken across Normanton on solid wall insulation. Anecdotally homes managed by the social landlord Spirita may already have some solid wall insulation, as this landlord historically rolled out some very early solid wall insulation programmes. This was particularly the case in the Pear Tree area of Derby, though some properties in Normaton my also have benefited. These programmes may not be fully documented. In these cases residents be unaware of the fact that their property has benefited from solid wall insulation

On the basis of our survey 94% of homes would potentially benefit from funding or initiatives to promote the financial and environmental savings from solid wall insulation.

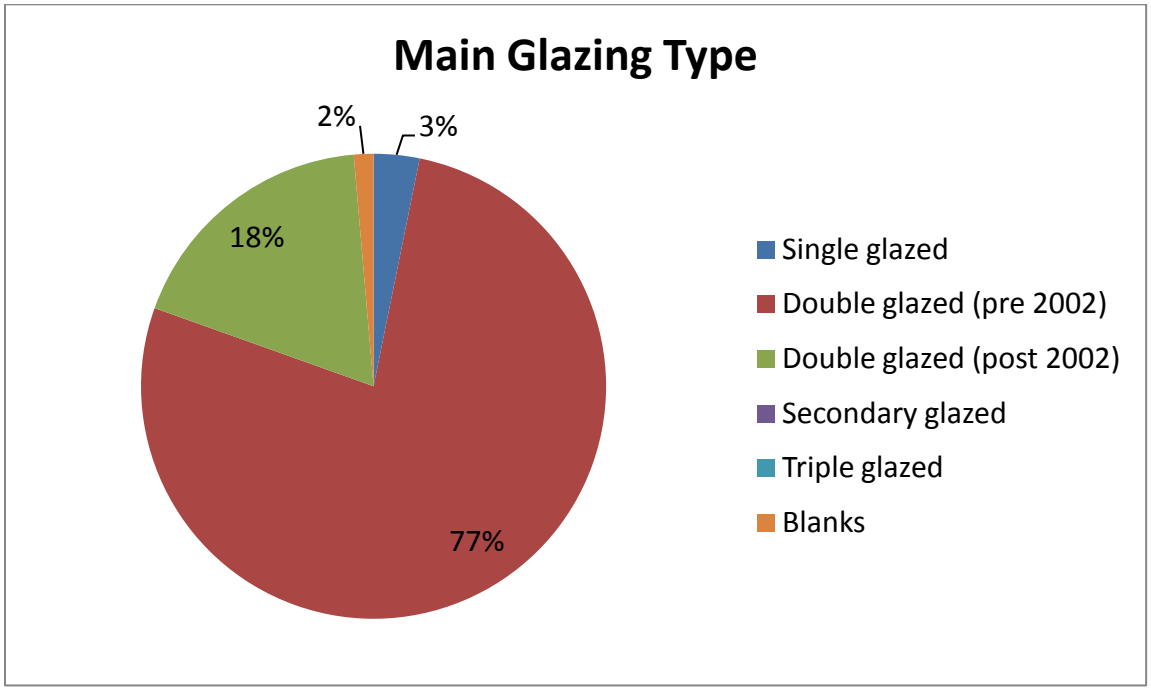
As homes are smaller and often terraced or semidetached householders may be averse to internal solid wall insulation that may be seen to reduce internal space in the property. External solid wall insulation may be a preferred option in many cases.

The intrusive nature of dry lining and the need to redecorate may be an impediment to undertaking this work. Again external insulation may be preferred. It would be valuable to identify a small number of pioneering early adopters, across housing types, who would be happy to undertake this work and act as case studies and advocates to convince others that the benefits of such home improvement work outweigh the costs and disruption.

Data on energy bill and carbon savings vs costs from real life local examples should be sought.

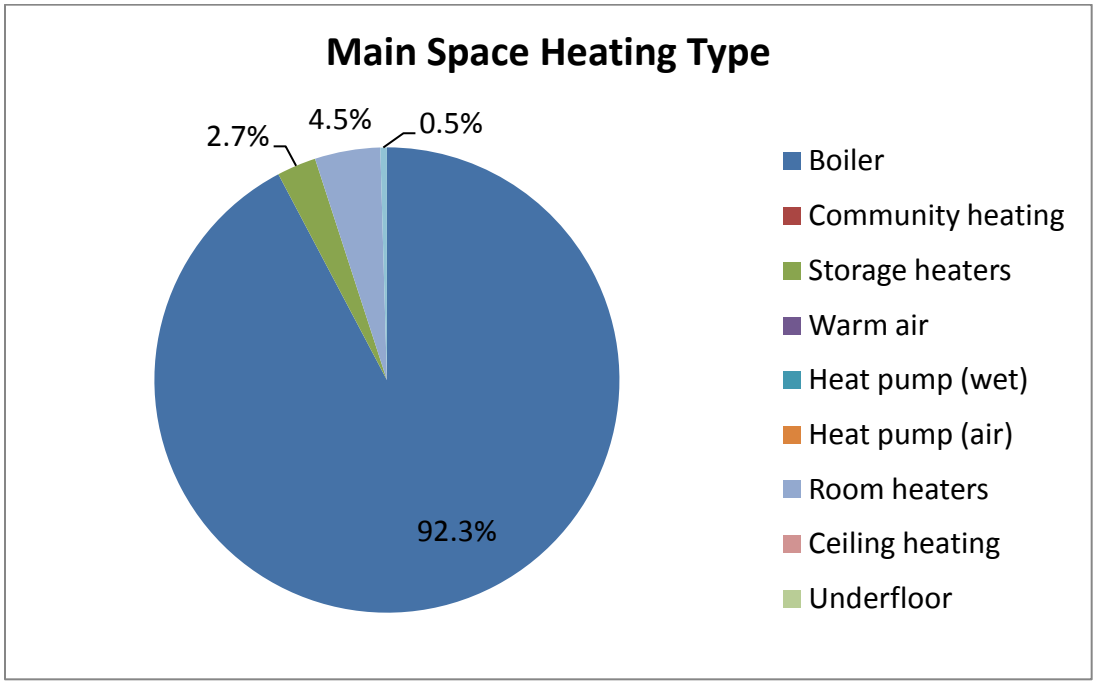
NEP have been delivering this type of work in Aspley and in the Radford and Hyson Green areas of Nottingham with significant impacts for householders

6.5 Glazing



Properties in Normanton seem to be already largely double glazed, there seems little merit in promoting the benefits of this technology further. While double glazing does improve noise levels and reduce drafts it generally has a long payback in energy and carbon terms.

6.6 Boilers



Domestic space Heating in Normanton is almost exclusively via mains gas central heating systems. There are a small but significant minority (4.5%) of homes that still have gas room heaters and just under 3% have storage heaters

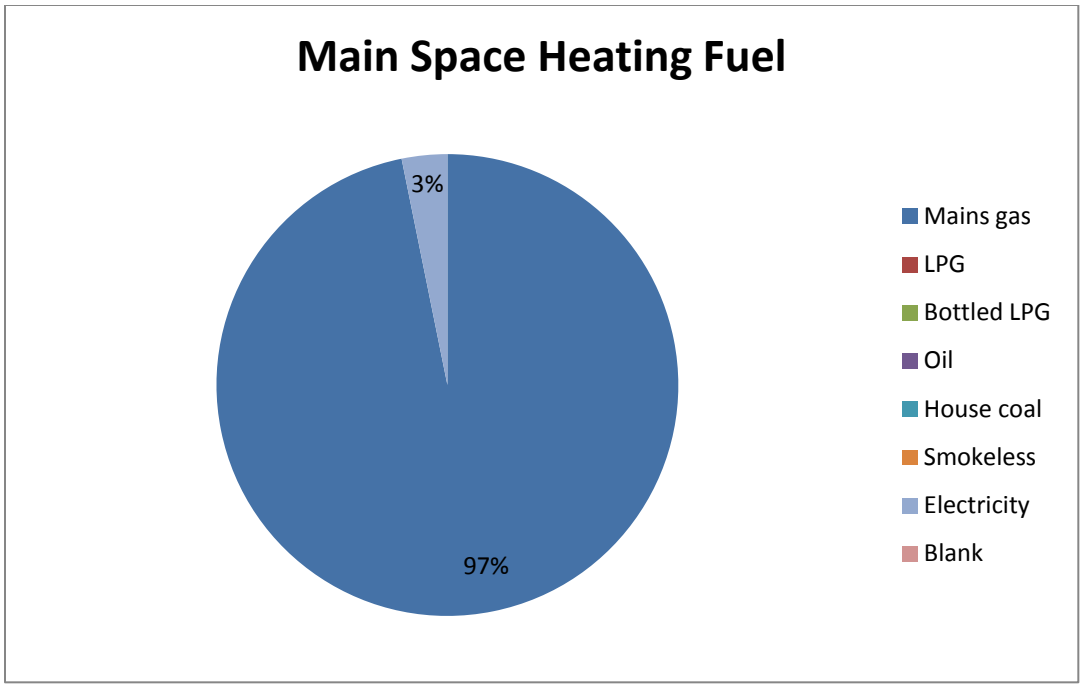
Energy use density in Normanton is around 18,000MWh/km2 per year, which is fairly high suggesting that district heating could be viable here.

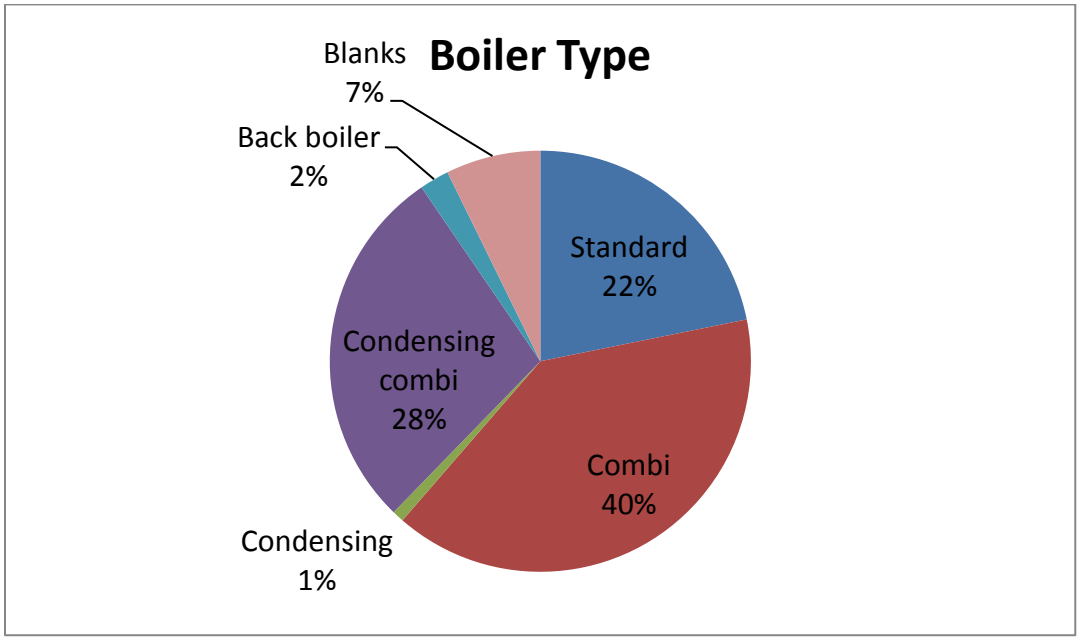
Several large non domestic energy users are also positioned around the community, such as Rolls Royce to the South East, London Road Community Hospital to the North East and the Derby City General Hospital to the North West. Futher North West is the old Kingsway hospital site which is earmarked for residential development. The site hosts a signfifcant but now moth balled coal fired heat plant that could be converted for biomass.

Consideration could be given to encouraging any development on this site to include investment in low carbon district heating either onsite or in neighbouing Normanton. Investment could be encouraged through local planning polic requirments, or theorugh the use of the expected Building Regulations driven 'Allowable Solutions' fund.

To ensure that revenues from any Allowable Solutions tariff stay in the local community, rather than be absorbed into a central government fund, will require communities and local authorities to have identified, mature investment ready opportunities. These investments will need to show clearly how they reduce carbon emissions to the level required to offset the new developmet.

Capturing funds from a development at the Kingsway site to support energy and carbon reduction in Normanton would have social, ecomonic and enviroenmental benefits.





29% of boiler in Normanton are condensing, 28% are condensing combination or tankless boilers. Condensing boilers if installed well are able to operate more efficiently than non-condensing boiler types. All new boilers installed since 2004 must be condensing types.

68% of boilers in Normanton are combination boilers, the remainder being largely system boilers with hot water tanks.

The split in data provided by Derby homes is different as a consistent programme of boiler replacement has improved the standards of boiler systems across Normanton's social housing stock

Boiler Type in social housing	Number	%
Combi	681	83%
Back boiler	79	10%
HW only	7	1%
System	50	6%
Total	817	

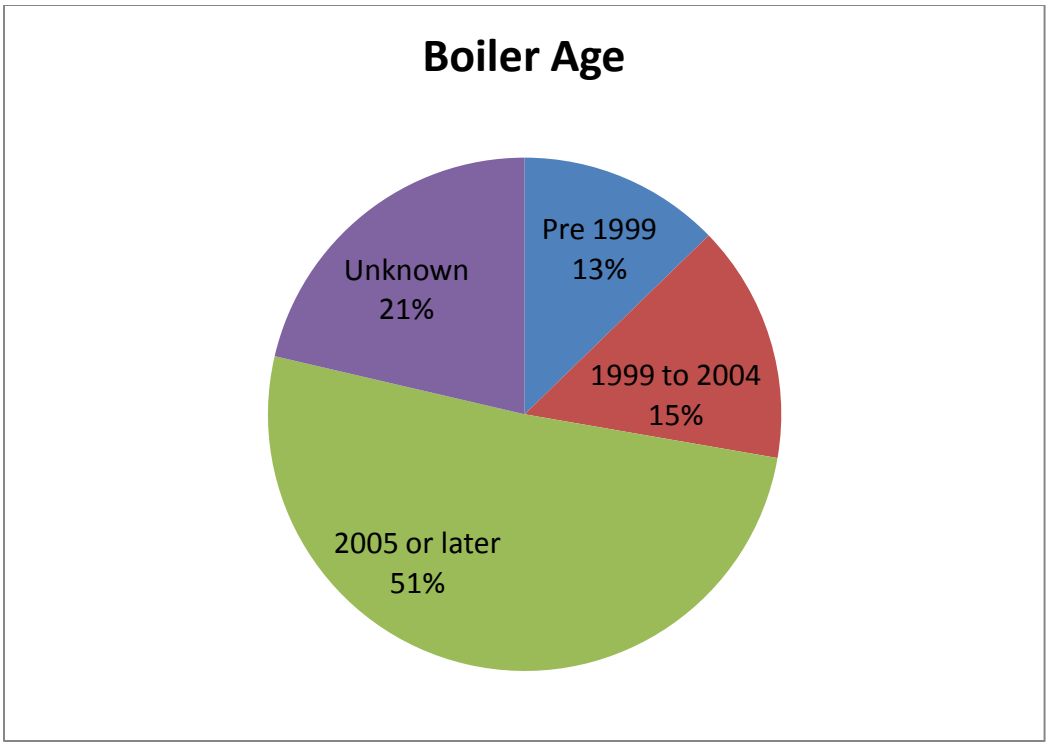
Very few homes seem to have opted to upgrade to tanked systems when they have upgraded from older non condensing systems to condensing systems. Only a vey small proportion of new condensing boilers in Normanton are tanked systems. It is likely that with smaller homes that householders would rather have the extra space. Smaller households with larger space heating demands are also likely to benefit more on their bills and carbon emissions from tankless systems. Combis are more efficient at space heating, but less efficient in delivering hot water. Solid wall properties with 2-3 bedrooms are likely to have energy use requirements that are weighted towards space heating than water heating making combination boilers the better option.

This, along with the capital cost, is also likely to limit the potential for solar water heating in this area, as householders are more likely to want to increase the internal space available and if solar water heating is perceived as requiring the retention of a tanked system householders may be reluctant to take it up even if the costs are subsidised.

If the premium for space is driving decisions about boiler choice, an investment worth several thousand pounds, a similar issue is very likely to arise around discussions regarding internal solid wall insulation.

More efficient boilers offer one of the most significant opportunities for car bon and cost savings. There is significant opportunity here to promote boiler upgrades to Normanton households through promotion of the cost benefits of investment in modern heating systems.

Many very old boilers will have been replaced through the boiler scrapage scheme. Identifying financing routes such as the green deal and promoting the return on investment and space savings available for new boilers should encourage householders to upgrade older boilers to newer condensing types.



26% of boilers are Pre 2004 and 13% are older than 13years. Typically a boiler will be replaced every 12 years and boilers older than 2004 are unlikely to be as efficient as modern systems.

Over half of the households visited stated that their boiler had been replaced since 2005. All boilers installed since 2005 should be of condensing type which suggests that a larger number of boilers are efficient condensing boilers that was picked up in the survey. This has been taken into account in the modelling

The 26% of properties with older boilers represents a key opportunity for householders in Normanton to save money and carbon and should form a central part of any promotion of energy saving investment opportunities locally.

The range of efficiencies of boiler types differs in social housing with information provided by Derby homes. Boilers in social housing are typically newer and more efficient that those in private and private rented property

Boiler Rating in social housing	Number	%
A	674	86%
B	30	4%
D	5	1%
G	75	10%
Total	784	

Normanton wide estimate of opportunity

Measure	% of sample	Extrapolated opportunity in Normanton
Boiler upgrade, pre 2004	28%	1789
Boiler upgrade, pre 1999	13%	830
Cavity wall insulation	3%	192
Solid wall insulation	94%	6005
Loft top up(less than 200mm)	24%	1533
Virgin lofts(less than 50mm)	11%	703
Double glazing	3%	192

Prevalent archetypes

Building archetypes were characterised by built form and number of habitable rooms to give 20 archetypes. Homes in Normanton are a lot more uniform than in other areas, being largely early 20th century redbrick solid walled terraced or semi detached housing. The full list is available in the appendices.

From these 5 common groups, split into 3 archetypes, were identified each representing more than 5% of the building stock. These 5 groups between them account for 77% of the housing stock.

Built form	No. Habitable rooms	Number in sample	% of total
Mid terraced no passage	4	11	5%
Mid-terrace with passage	4	23	11%
Mid-terrace with passage	5	30	15%
Semi-detached	4	40	19%
Semi-detached	5	54	26%
		Total	77%

In targeting programmes, maximum impact could be achieved by designing programmes around these 3 archetypes. Case study material targeted at these homes could have most resonance with the residents of Normanton.

Archetype 1-Mid terraced, no passage

This archetype represented around 5% of our sample, however cross referencing with other independent data sources suggests that that may be an underestimate of the total proportion across the area.

These properties are typically 4 room 1930-49 solid wall, mid terraced properties .A property on Caxton street would serve as a good exemplar. Typically these properties have a wide range of occupancy with a large number in single occupancy and lesser but significant large number with 6 or 7 residents. The majority are Local Authority owned or private rented and have a non-condensing combi boiler and more than 200mm of loft insulation. SAP ratings are generally high at around 69.

Residents are likely to have an annual energy bill of £1,250, if properties are fully heated. All of these households would require a household income of around £12,550 to avoid fuel poverty. With these homes water heating is likely to represent 22% of energy costs, though this ranges from 11% under single occupancy to 33% under high occupancy. Electricity bills represent around 54% of the total energy use though up to 60% in homes under high occupancy.

With small properties internal insulation is unlikely to be popular, external insulation systems would be likely to offer the most popular and least expensive route. Despite preconceptions however, internal insulation if applied to front and back only, is unlikely to result insignificant lost floor area and internal space. Persuading residents of this will require the establishment of exemplar properties in the community.

Establishing whole street programmes where possible would benefit social tenants and private tenants. Collaboration with local landlords to develop programmes that cover all homes in a street, with Green Deal or ECO funded installations,, would be a good approach. Recent statements from DECC imply that ECO funding will also be available for social housing programmes[28]. This would open he way for these types of bulk, cross tenure programmes in Normanton.

While most homes have combi boilers, the homes with large numbers of residents and high hot water use could benefit from having tanked systems, however space availability may undermine this. Working with single or low occupancy homes to support energy saving through better energy management, ie turning of heating in unoccupied rooms could further reduce energy bills and carbon emissions

Archetype 2-Mid terraced with passage

This group represents 26% of our sample, though cross referencing other independent data sources suggests that this is the most prevalent archetype in Normanton.

As with the mid terraced properties without passages, there are similar issues with respect to solid wall insulation. However, there are a number of specific areas particular to this group that will need to be considered in developing any programmes

[28] http://www.decc.gov.uk/en/content/cms/news/dpm_eco/dpm_eco.aspx

A typical mid-terraced with passage in Normanton would be a 4or 5 room pre 1900 property on Crewe Street ,or a 1900-1929 property on Balfour Road. These properties are less energy efficient than non-passage properties above. The average occupancy of these properties is 3.3 people however over 34% have only 1 or 2 occupants.

Important to note is that the tenure is roughly 50% private rented, and 50% owner occupied.

There is a fairly even split between combi, condensing combi and system boilers. Most have sufficient loft insulation, ie over 200mm, however about 23% have less than 50mm and could still benefit from free insulation under the current cert programme.

32% reported having no low energy light bulbs. This increased to 50% of the 4 room properties. SAP ratings are generally lower than other areas of Normanton at an average of 58.

Residents are likely to have an annual energy bill of £1,800, if properties are fully heated. All of these households would require a household income of around £18,200 to avoid fuel poverty. With these homes water heating is likely to represent 15% of energy costs, though this ranges from 8% under single occupancy with a condensing comb to 23% under single occupancy with an older poorly controlled system boiler. Electricity bills represent around 40% of the total energy use though up to 60% in homes under high occupancy.

The homes with the largest hot water heating bills are those with standard boilers in these homes hot water costs make up around 21% of the overall energy bill as compared to 12% of the energy bill in homes with combi boilers. System boilers add about £325 to the annual household energy bill.

Homes with Combi boilers would need to earn £17,300 to avoid fuel poverty as opposed to £20,500 in those with system boilers. Homes with condensing combi boilers would need to earn on average £16,900 to avoid fuel poverty.

With this archetype the prevalence of private rented and owner occupied properties mean that convincing landlords and home owners of the suitability of solid wall insulation will be the critical path.

Insulating mid terraced properties with passages will present a number of specific challenges. Ensuring that external insulation of passage ways does not restrict access for the movement of bins for example. Insulating over passages will also be necessary.

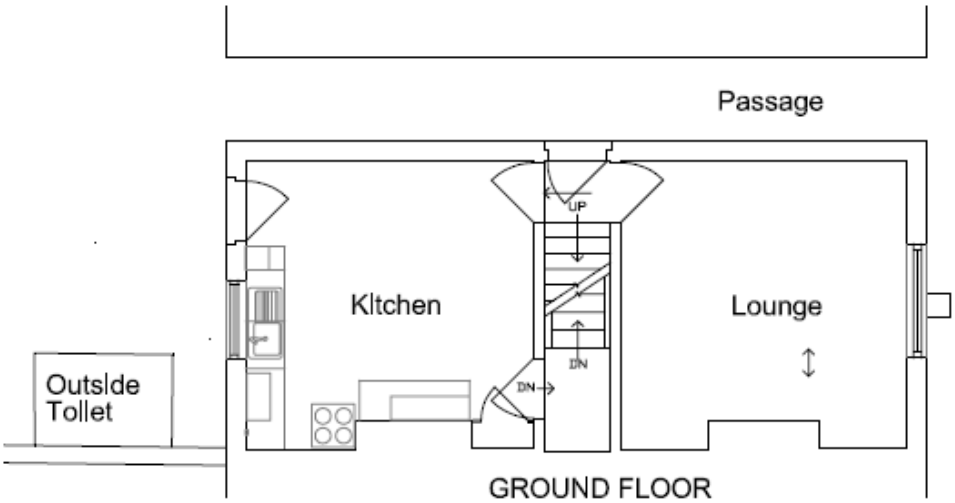
The high potential for fuel poverty in this housing type should support the application of programmes that use Social ECO funding to provide potentially free solid wall insulation. This could go some way towards convincing private landlords and home owners that upgrades are desirable.

The lower than typical levels of low energy lighting and prevalence of lower levels of occupancy should be considered in any programmes for this archetype. This would suggest that education and behaviour change programmes should be included alongside any offers of building fabric upgrades. Landlords should be encouraged to switch bulbs for low energy bulbs at time of letting

The fairly high number of homes still with insufficient loft insulation should be addressed quickly, before the end of the current cert programme. Engagement with landlords and local community representatives such as neighbourhood watch and local faith centres should be a priority, with the message that after the end of this year home owners may have to pay for work themselves.

If it is not already in place it is essential that work is done to engage small private land lords in the area. An offer of support in accessing ECO grants to upgrade properties could encourage landlords to come forwards and register an interest.

A project in Sheffield to address the low carbon retrofit of a mid terraced property with passage has been well documented by the Energy Savings Trust. This serves as an excellent case study for this type of home and could potentially be used as a blueprint for demonstrating the potential to a landlord or local home owner.[29]Some excerpts are shown below.



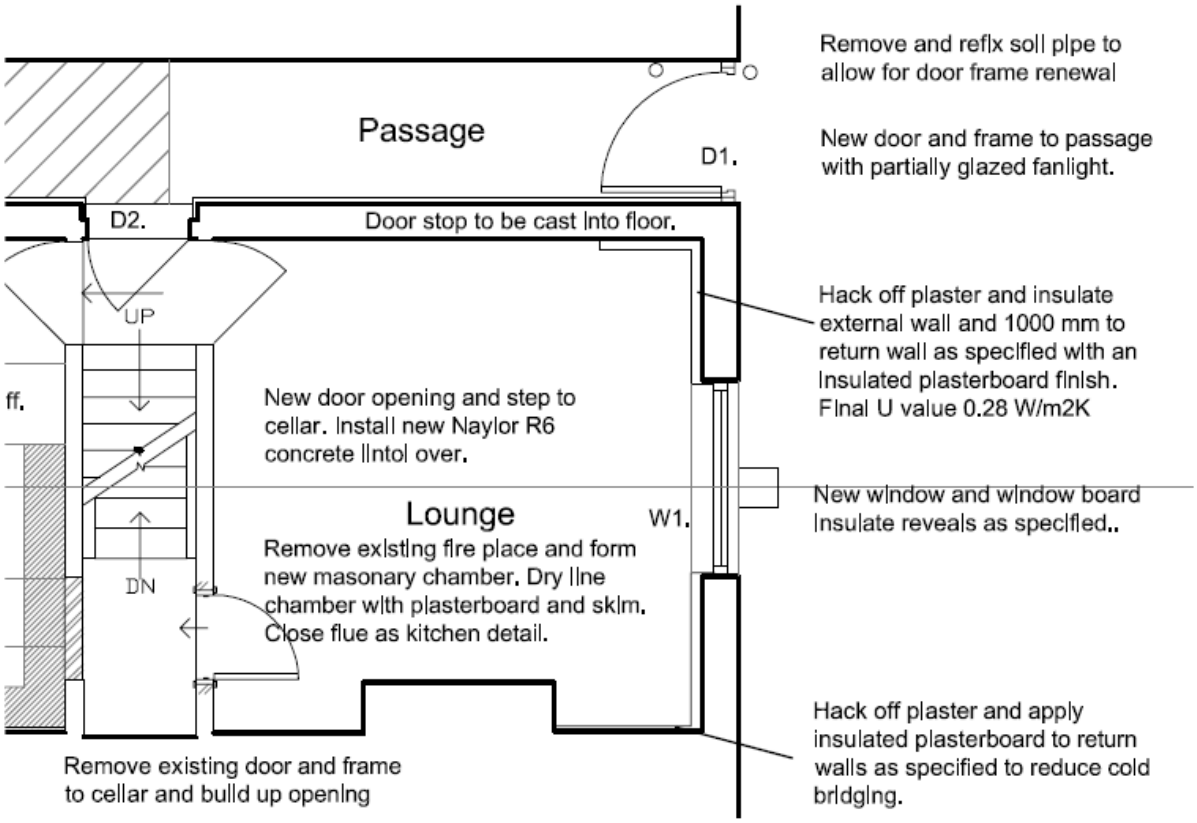
While front wall insulation can be done internally with little loss of space. Insulation of solid wall passages, as with end walls, may need to be done externally. This insulation should be both of the wall and the floor over the passageway.

[29] http://www.energysavingtrust.org.uk/Publications2/Housing-professionals/Refurbishment/Sheffield-EcoTerrace-A-refurbishment-case-study

Savings from solid wall insulation will be significant, particularly with terraces with passages, semi-detached properties and end terraced properties.

The Sheffield project reduced heat loss from walls by over 80% through the application of solid wall insulation

Below is a schematic of the installed insulation on the Sheffield Eco-terrace.



Note that internal insulation has been applied to the front and external insulation within the passageway, creating minimal obstruction to internal doors and circulation space around the stairway.

Image of externally insulated enclosed passage

Archetype 3-Semi detached

This group represents 45% of our sample though cross referencing with other independent data suggests that this is an overestimate of the proportion of semi detached housing in Normanton; the actual proportion being closer to 28%.

A typical semi-detached property in Normanton would be a 4or 5 room 1930-49 property on Balfour Road, Bethulie Road, Portland Street or Pear Tree Crescent. These properties are less energy efficient than terraced properties. The average occupancy of these properties is 3.4 people however over 40% have only 1 or 2 occupants.

Important to note is that the tenure is roughly 32% private rented, and 60% owner occupied. There are a smaller number of social rented properties.

44% have combis, 28%, condensing combi and 21% non condensing system boilers. Most have sufficient loft insulation, ie over 200mm, however about 10% have less than75mm and could still benefit from free insulation under the current cert programme.

Most have 100% low energy light bulbs. However 20% reported less than 50% low energy bulbs. SAP ratings are considerably lower than other areas of Normanton at an average of 49.

Residents are likely to have an annual energy bill of £2,085, if properties are fully heated. All of these households would require a household income of around £20,850 to avoid fuel poverty. 51% of Normanton households earn less than £20K meaning that residents of Archetype 3 are considerably at risk of fuel poverty.

With these homes water heating is likely to represent 13% of energy costs, though this increases to 22% in properties with system boilers. Electricity bills represent around 36% of the total energy use.

The homes with the largest hot water heating bills are those with standard boilers. In these homes. System boilers add about £230 to the annual household energy bill.

With this archetype, as with archetype 2, the prevalence of private rented and owner occupied properties mean that convincing landlords and home owners of the suitability of solid wall insulation will be the critical path.

Anecdotally, Walbrook Housing Association undertook a very early solid wall insulation programme in the Pear Tree area of Normanton. Consequently, a number of now Spirita managed, or ex Spirita right-to-buy properties, may well already have been solid wall insulated. Current occupants may well be unaware of this fact.

Finding local exemplars from this early programme in Pear Tree and monitoring energy use, may be a useful route to providing evidence and case studies for local residents of the financial benefits and implications for internal space with solid wall insulation

The very high potential for fuel poverty in this housing archetype should support the application of programmes that use Social ECO funding to provide potentially free solid wall insulation. This could go some way towards convincing private landlords and home owners that upgrades are desirable.

The prevalence of lower levels of occupancy should be considered in any programmes for this archetype. This would suggest that education and behaviour change programmes that support households in reducing unnecessary heating of unoccupied rooms, should be included alongside any offers of building fabric upgrades

If it is not already in place it is essential that work is done to engage small private land lords in the area. An offer of support in accessing ECO grants to upgrade properties, potentially at no cost, could encourage landlords to come forwards and register an interest.

Stock analysis data

Row Labels	Average of Footprint (m2)	Average of Habitable Rooms	Average of Total Number of Occupants	Count
Detached	75.80	4.60	2.50	10.00
Mid-terrace	53.03	4.68	3.41	63.00
End-terrace	51.00	5.00	5.00	1.00
Semi-detached	47.70	4.49	3.33	101.00
Enclosed end	45.00	4.22	3.56	9.00
Enclosed mid	41.14	4.00	2.77	22.00
Grand Total	**49.89**	**4.49**	**3.27**	**206.00**

As previously stated, due to late changes in methodology necessitated by poor response rates, our sample was not as randomized as hoped, this means that we surveyed more semi detached properties than are representative of the community.

It should also be noted that small sample size data sets such as the single end terrace property surveyd cannot be extrapolated as representative of the community.

Row Labels	Average of SAP	Average of CO2	Average of space heating energy (KWh)	Average of water heating energy (kWh)
Enclosed mid	71.05	3948.82	6398.41	6041.24
Enclosed end	59.33	5797.78	14281.94	6010.31
Mid-terrace	58.67	6364.71	17168.58	6029.60
Semi-detached	49.22	7431.22	23262.66	6072.52
End-terrace	45.00	8699.00	27579.42	5909.74
Detached	44.50	8349.60	29991.19	5608.47
Grand Total	**54.63**	**6712.52**	**19553.12**	**6030.02**

Semi detached and mid terraced properties with passages are the most common types even though they do not have the highest carbon footprints. The average SAP rating for semi detached properties is particularly low and heating costs high, meaning that residents in these properties will be significantly at risk of fuel poverty.

In designing a community wide solid wall programme first priority should be given to targeting the semi detached properties.

Row Labels	Average of Space Heating Costs	Average of Water Heating Costs	Average of Electricity bill	Average of Required income to avoid FP
Detached	£1,328.61	£248.46	£690.45	£22,675.19
Enclosed end	£632.69	£266.26	£768.71	£16,676.54
Enclosed mid	£283.45	£267.63	£661.23	£12,123.08
End-terrace	£1,221.77	£261.80	£883.30	£23,668.68
Mid-terrace	£760.57	£267.11	£784.55	£18,122.34
Semi-detached	£1,030.54	£269.01	£742.35	£20,419.02
Grand Total	**£866.20**	**£267.13**	**£745.91**	**£18,792.45**

Row Labels	Average of Footprint (m2)	Average of space heat pm2	Average of water heat pm2	Average of power pm2
Detached	75.80	435.22	88.34	67.34
Mid-terrace	53.03	329.78	116.09	102.31
End-terrace	51.00	540.77	115.88	119.20
Semi-detached	47.70	490.34	131.53	108.45
Enclosed end	45.00	318.83	136.04	118.10
Enclosed mid	41.14	153.40	149.58	112.34
Grand Total	**49.89**	**395.33**	**126.76**	**105.47**

Potential funding sources

Normanton is an area ideally suited to the ECO element of the green deal. While in the 1st year or so the Green Deal is likely to remain focussed on loft and cavity wall insulation to mop up remaining opportunities. The focus of funding will shortly move to solid wall insulation programmes.

Currently all insulation and energy saving measures are either funded through the government Warm Front Grant scheme or through an obligation placed on energy companies called CERT.

From the end of 2012 all CERT funding will be redirected through the governments ECO programme to support the delivery of the Green Deal.

The Green Deal is a loan finance programme that enables home owners to improve their property and repay the loan at a low interest rate through savings on their energy bills. The savings on bills must be greater or equal to the loan repayments. This is called he Golden Rule.

The ECO fund will be split 50:50 with ½ going towards reducing the cost of measures for hard to treat homes so that expensive improvements like solid wall insulation can meet the golden rule. The other ½ of the ECO funding (Social ECO) will go towards supporting the poorest households access home improvements.

Recent government statements have suggested that the Social ECO will also be available to registered social landlords.

It is likely that cultural and financial barriers will prevent many in Normanton from accessing the Green Deal home loan programme. Many people in less affluent communities simply do not want to borrow money or be in debt, even if the debt is with the house rather than the person.

In some ethnic and social groups lending and borrowing of money is not allowed. Sharia Law for example prohibits the fixed or floating payment or acceptance of specific interest or fees (known as riba or usury) for loans of money. Investing in businesses that provide goods or services considered contrary to Islamic principles is also haraam (forbidden).

Given the large muslim population in Normanton (22% from 2001 census figures) it would be prudent to ascertain whether the Green Deal meets the requirements of Sharia Law before promoting this scheme heavily to the local community. This could help ensure that programmes do not inadvertently discriminate against sections of the local community

This issue is dealt with briefly in the Green deal impact assessment [30]with the conclusion that ,these products may be more expensive and that if there is a market for such products than providers will provide them. If the market is busy enough providing non Sharia products however here may be no incentive to provide a more niche product for some time, disadvantaging muslim households

[30] http://www.decc.gov.uk/assets/decc/11/consultation/green-deal/3603-green-deal-eco-ia.pdf

The programmes supported through the social ECO fund should not present the same problems as it will be broadly similar to the current grant aided programmes.

If levels of funding develop as they appear to be doing currently the Social ECO may even present an opportunity to provide solid wall insulation at no cost to the most vulnerable fuel poor households, called in the Super Priority Group. This group typically includes low income households, elderly or disabled, claiming one or more qualifying benefits.

Delivery of street by street programmes is recommended. For this a detailed tenure map of Normanton will be required and close engagement with the large number of local private landlords.

For landlords this type of property investment will cost them nothing, however they will also not directly benefit, as both savings and repayments will be made by tenants through energy bills. There can be no guarantee that this type of work will increase the value of the home in terms of rental or resale value. Reassurance will be required that rents will not be affected, works will be made good with paint and finish and that provision will be made for tenants to be accommodated while work is being carried out.

Other similar programmes have used a decant house as a temporary accommodation for a day or 2 while residents homes are improved.

Appendices

1. Archetypes

Row Labels	Number
Detached	**10**
4	4
5	6
Enclosed end	**9**
3	1
4	5
5	3
Enclosed mid	**22**
2	1
3	5
4	11
5	3
6	2
End-terrace	**1**
5	1
Mid-terrace	**63**
2	1
3	1
4	23
5	30
6	8
Semi-detached	**101**
2	1
3	5
4	40
5	54
6	1
Grand Total	**206**

2. Area Map